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Safety Commission

Commission canadienne de
sûreté nucléaire

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14th floor
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Ottawa, Ontario

Salle des audiences publiques
14e étage
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Ottawa (Ontario)

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Ottawa, Ontario

--- Upon commencing on Wednesday, August 19, 2015
at 0901 / L'audience débute le mercredi
19 août 2015 à 0901

M. LEBLANC : Bonjour, Mesdames et Messieurs.
Bienvenue aux audiences publiques de la Commission
canadienne de sûreté nucléaire. Mon nom est Marc Leblanc.
Je suis le Secrétaire de la Commission et j'aimerais
aborder certains aspects touchant le déroulement des
audiences.

The public hearing this morning is regarding
the application by Nordion (Canada) Inc. for the renewal of
their operating licence. There is also a public hearing
scheduled for this afternoon on Ontario Power Generation's
application for the renewal of the operating licence for
the Darlington Nuclear Generating Station.

During today's business, we have
simultaneous translation. Des appareils de traduction sont
disponibles à la réception. La version française est au
poste 2 and the English version is on channel 1.

I would ask that you please keep the pace of
your speech relatively slow so that the interpreters have a
chance to keep up.

L'audience est enregistrée et transcrite
textuellement.

I would also like to note that this proceeding is being video webcast live and that the proceeding is also archived on our website for a 3-month period after the closure of the hearing. Les transcriptions seront disponibles sur le site web de la Commission dès la semaine prochaine.

To make the transcripts as meaningful as possible, we would ask everyone to identify themselves before speaking.

As a courtesy to others in the room, please silence your cell phones and other electronic devices.

Monsieur Binder, président et premier dirigeant de la CCSN, présidera les audiences publiques d'aujourd'hui.

Mr. President...?

THE PRESIDENT: Thank you, Marc.

Good morning and welcome to the public hearings of the Canadian Nuclear Safety Commission.

Mon nom est Michael Binder, je suis le président de la Commission canadienne de sûreté nucléaire.

Je souhaite la bienvenue aux gens ici présents and welcome to all of you joining us via the webcast and videoconferencing.

I would like to introduce the Members of the Commission that are with us here today.

On my right is Monsieur Dan Tolgyesi; to my left are Dr. Sandy McEwan, Ms Rumina Velshi and Monsieur André Harvey.

We already heard from our Secretary Marc Leblanc. We also have with us Ms Lisa Thiele, Senior General Counsel to the Commission.

***CMD 15-H6.A**

Adoption of Agenda

THE PRESIDENT: So I would like, to start, to call for the adoption of the Agenda, as described in CMD Member Document 15-H6.A.

Do we have concurrence?

UNIDENTIFIED SPEAKER: Yes.

THE PRESIDENT: For the record, the agenda is adopted.

The hearing this morning is to consider the application by Nordion (Canada) Inc. to renew its nuclear processing facility licence.

Marc...?

MR. LEBLANC: The Notice of Public Hearing 2015-H-03 was published on February 6th of this year.

Submissions from Nordion and CNSC staff were due on June 19th.

The public was invited to participate by written submissions and oral presentations. July 20th was the deadline set for filing by intervenors. The Commission received 14 requests for intervention. One intervenor will be providing an oral presentation and the others are participating in writing.

Participant funding was available to intervenors to prepare for and participate in this public hearing. No applications were received for participant funding.

August 12th was the deadline for filing of supplementary information and presentations. I note that presentations have been filed by CNSC staff as well as Nordion.

We will soon proceed with the presentations by Nordion, followed by CNSC staff and then the intervention by Lantheus Medical Imaging. This will be followed by a first round of questions. The Members will then have the opportunity to ask questions on all of the written submissions filed by the other intervenors as well.

Mr. President...?

***CMD 15-H7.1/15-H7.1A/15-H7.1B**

Oral presentation by Nordion (Canada) Inc.

THE PRESIDENT: So I would like to start the hearing by calling on the presentation from Nordion (Canada) Inc., as outlined in Commission Member Documents 15-H7.1, 15-H7.1A and 15-H7.1B.

I understand that Mr. McIntosh will make the presentation. Please proceed.

MR. McINTOSH: Good morning. Good morning, President Binder, Members of the Commission and CNSC staff. My name is Scott McIntosh and I am President of the Gamma Technologies and Corporate Services Business Unit for Nordion.

Over the next few minutes, Rick Beekmans, our Director of Environmental Health and Safety, and I will explain why we are applying for a new licence, why it is essential to our business and how we prepared for the next decade and beyond. In addition, we will address questions about the recent fire at Nordion's Ottawa facility.

I would like to start today by addressing our licensing term request.

The Nordion team has worked meticulously over the last year in preparation for today's hearing. We are confident in the work we have done in the current 10-

year term, building systems to support our safety programs that have and will continue to serve us in the coming licensing period.

With increased public oversight implemented by CNSC such as yearly public hearings for licensee performance review and our own public information program, Nordion originally requested a 20-year site licence.

Having said that, we understand a 20-year site licence has never been granted to a Canadian organization and that it might be challenging for CNSC to support a 20-year term. As much as we are confident that we are able to support a requirement for a 20-year licence, we stand before you today requesting a 10-year licence or greater if the Commission should deem it appropriate.

During the current licensing period which commenced in 2005, Nordion underwent a significant evolution. We changed our name from MDS Inc. to Nordion (Canada) Inc. We divested four significant product lines to focus strategically on the Gamma Technologies and Medical Isotope business units.

In 2014, Sterigenics International LLC, a U.S.-based global leader in contract sterilization services and Nordion's largest cobalt customer, acquired Nordion. Even with this change we remain a standalone business within Sterigenics. We remain headquartered in Ottawa and

we continue to operate under the Nordion name.

And through the changes, an unwavering commitment has remained to being a fully compliant organization, always adopting and often developing best practices to maintain the safety of our employees, customers, patients and the community at large. This commitment continues in every way under our current ownership.

We are and we will remain a global healthcare organization. We employ 382 employees, with 331 of those people located in the Ottawa facility. We offer jobs in the nuclear and health science field to many professionals. Where employment for scientists has decreased markedly in Ottawa, our need for scientists and engineers continues unabated.

Our Gamma Technologies and Medical Isotopes products continue to improve the health and well-being of millions of people around the world each day, including tens of thousands of Canadians. It's highly likely that our products have in some way touched you, a family member, a friend or a neighbour.

In our Medical Isotopes business we manufacture a unique portfolio of isotopes which our customers then incorporate into products that are used in medical procedures for patients. Our medical isotopes are

used in the diagnosis and treatment of disease, including applications for cardiology, neurology, oncology and research. One of our primary isotopes is Molybdenum-99, the parent of one of the most commonly used imaging agents, Technetium-99m. Technetium-99m is used in a variety of diagnostic procedures such as heart, lung, brain and bone scans.

In our Gamma Technologies business we manufacture two types of Cobalt-60 sources. The first, and most widely used, is sourced primarily from Canadian nuclear power reactors and helps sterilize more than 40 percent of the world's single-use medical devices, equipment such as sutures, surgeon's gloves, syringes, and in fact our parent company, Sterigenics, is the world's leading provider of this service to medical device manufacturers. Irradiation of food products to ensure safe consumption -- spices for example -- is another application.

The second type of Cobalt-60 is our high-specific activity or HSA sources. This is obtained from Canadian Nuclear Laboratories in Chalk River and used for gamma therapy equipment primarily to treat brain cancer.

There are very few companies around the world that do what Nordion does. Because we are a health science organization that provides products for clinicians

to treat patients and we operate a nuclear facility, we are certainly one of the most regulated companies in the world. We are very committed to complying with all regulations for safety of our employees, our customers, the environment and our community.

As a testament to our commitment to safety, in 2013 Nordion was recognized as Canada's safest employer among all manufacturers by Thomson Reuters. In addition to being recognized for our safety standards, the City of Ottawa also highly regards Nordion's regulatory and safety commitments, having passed a motion on June 8th of this year in support of our relicensing term. This also illustrates our ongoing visibility in the community.

In 2005, the CNSC granted us an unprecedented 10-year licence. This decision reflected confidence in Nordion's environmental, health and safety standards, and policies and practices as a nuclear business.

Over that 10-year licence term we believe we have demonstrated that your decision was sound. We have continuously strengthened our Environmental Management System and Radiation Protection Program. We have sought and achieved certification to ISO 14001. We have developed, maintained and enhanced our Public Information Program. We have steadily improved transportation safety

and security and we have invested in numerous improvements to our facility and much, much more.

Two weeks ago we had an incident that required us to execute our Emergency Response Plan, or ERP, when repairs to the roof of our facility in Ottawa resulted in a fire. While we are still working with experts on the actual investigation, initial results indicate that implementation of our Emergency Response Plan went very, very smoothly, which is a result of years of practice and a sophisticated and detailed Emergency Response Plan. In addition, it was combined with strong relationships we have built with the city, with fire, paramedic, police services.

In a few moments, Mr. Beekmans will talk more about this event as part of the emergency management safety and control area.

It is appropriate to note that no radiological release occurred during this incident and that no employees or members of the community were injured as a result.

Beyond our everyday business, Nordion is also highly regarded for its corporate social responsibility. In fact, our level of community support has continued to grow, with Nordion supporting numerous local not-for-profit organizations, including local hospitals such as the Queensway-Carleton, CHEO, The Royal

Ottawa and The Ottawa Hospital. As a community partner, we support a variety of initiatives that reflect our core values, while also providing rewarding opportunities for our employees in the community to get involved.

At Nordion, of course, we do long-term business planning and preparation. It's part of being a business that intends to be here for many, many decades. We have a strategy to supply stable long-term medical isotopes and Cobalt-60 over the next decade and beyond. We have current supply contracts in place beyond 2028 and thousands of industry members depend on Nordion for the critical products we produce and deliver every day. This again includes customers, physicians and their patients.

With that, I will turn the floor over to Rick Beekmans, who will provide greater detail and progress over the last 10 years and steps that we are taking to ensure that we are successful for the future.

MR. BEEKMANS: Thank you, Scott.

Good morning, President Binder, Members of the Commission and the CNSC staff.

I will now walk you through the following key performance topics: management systems, radiation safety, environmental protection, conventional health and safety, emergency management, security and our Public Information Program.

Before we discuss the Safety and Control Areas, or SCAs, I want to explain to everyone where Nordion is located. Our primary production facility, the Kanata Operations Building, or KOB, is located in Ottawa, Ontario on a parcel of 56.8 acres. This Google map shows the location of our Class 1B nuclear facility. The surrounding area is a mixture of industrial park and subdivisions.

I would like to reemphasize something Scott said. Nordion's purpose is to make a distinctive contribution to the health and well-being of people around the world. We are committed to achieve that purpose without adversely affecting the community in which we work and live. We have a comprehensive document management system that provides the basis of our programs and procedures that protect health, safety, security and the environment.

The first Safety and Control Area I want to describe is our Management System. The heart of the Management System is our Quality Assurance Program for Safety which was implemented within the licensing period in December 2006. The Quality Assurance Program for Safety provides the means of controlling those activities that affect all CNSC-licensed activities conducted under our Class 1B nuclear substance and processing facility operating licence.

Nordion revised the Quality Assurance Program for safety throughout the licensing period as a result of performance reviews and to address CNSC requirements. One such proactive enhancement was to ensure appropriate environmental health and safety experts are involved in the non-conformance systems. Their involvement ensures the best decisions are being made to identify, address and correct issues that impact the environment, health and safety in a timely manner.

We proactively expanded the scope of our annual performance reviews to include the review of additional performance indicators such as incidents, deviations and complaints, just to name a few. As a result, trends are identified more quickly and improvement programs were added.

We proactively improved our change management process. The Hazard Checklist, which is part of this process, was streamlined to better assess proposed changes and their effect on safety. We added an Environmental Health and Safety Requirements Checklist which is completed for all changes or projects with a potential impact on the environment or the health and safety of the public or staff at Nordion. These changes ensure early and adequate environmental health and safety oversight of any new projects or design changes.

As our business grew over the last 10 years we proactively strengthened our Management System to meet regulatory requirements. Today we have 50 percent more operational controls to support our management systems than we did in 2005. The controls ensure regulatory compliance of all our safety systems and processes.

We made a significant improvement to our Management System in 2012 when we implemented the Electronic Quality Management System, or EQMS, that facilitated document management and procedural training. Today all of Nordion's procedures, policies and specifications are now online. As a result, this allows for electronic creation, versioning, review and approval, storage, retrieval and distribution of documents, as well as notification, tracking and completion of training requirements.

The second Safety and Control Area is Radiation Safety. We continue to implement measures to keep radiation doses received by workers and members of the public as low as reasonably achievable, or ALARA. This was achieved through management control over work practices, personnel qualifications and training, control of occupational and public exposure to radiation, and planning for unusual situations.

I will show you our performance over the

current licensing period.

Radiation doses are reviewed and assessed in accordance with the ALARA principle. All employees who regularly work in the processing area are classified as nuclear energy workers, or NEWS, and are assigned monthly dosimeters. On the screen, the solid black line at the top represents the regulatory limit of 50 mSv per year dose to NEWS. The green bars at the bottom of the chart are the maximum doses to any of our NEWS in a given year. As you can see, the doses received are well below the regulatory limits.

The orange line in the middle represents the volume of Cobalt-60 shipments, which, as you can see, have significantly increased in the last couple of years. Although shipments increased, doses to Cobalt shippers resulted in lower maximums. We reduced the dose through various improvements.

One such improvement was the installation of a concrete shielding wall in the facility where shipping packages are stored prior to shipment. This change reduced radiation levels and provided a designated area for inactive work to occur. We designed and manufactured an innovative supplemental temporary shield to provide additional protection to shippers while they are working more closely with loaded cobalt shipping containers. These

lead jacket shields have proven to reduce the dose associated with the task of working on a container by 75 percent.

In addition to these initiatives to reduce dose, we made further improvements to radiation safety over the licensing period, both in the facility and in our equipment.

The facility improvements we made include: moving the I-131 process to a new hot cell facility and adding an uninterruptible power supply to further reduce the potential of I-131 emissions in the event of a power failure; decommissioning of the Carbon-14 facility and replacing and upgrading various components of our alarm monitoring system; as well as the remaining improvements listed on this slide.

The equipment improvements we made include: replacing hand and foot monitors with whole-body contamination monitors so that now all three of our major exits have whole-body contamination monitors; installing additional airflow samplers at release monitoring points and designing and fabricating new airflow monitors; installing a new resin removal system for our Cobalt Pool deionizer; as well as the remaining improvements on this slide.

Now, let's talk about the dose to the

public.

The top left chart seen on this screen uses a logarithmic scale and the bottom right chart uses a standard scale on the Y axis. Both charts demonstrate that based on Nordion's emissions the highest potential dose to the public was .04 mSv per year, which is well below the regulatory limit of 1 mSv per year and the estimated 6.1 mSv per year that the average person receives from medical and ubiquitous background sources.

We're now going to talk about radiation incidents and improvements.

This chart is a summary of the radiation exposure events for the licensing period. As you can see, at the beginning of the licensing period, we experienced some incidents. And, over the years, we decreased the number of incidents as a result of improving our programs. This demonstrates the strength of our programs.

There have been 10 radiation incidents during the licensing period, but none since 2009. These incidents were primarily due to TLDs being returned late and processed without control dosimeters. We have had a number of ALARA reports in 2007 mainly due to issues with TLD handling which caused non-personal doses to be recorded or issues with our Iridium-192 Facility.

As a result, we put in place improved

procedural and engineering controls. As well, we developed a new safety training program specifically for personnel processing iridium-192. The continuous decrease in both radiation incidents and ALARA reports after this point is due to the many efforts I have just described.

The third Safety and Control Area I want to elaborate upon is environmental protection. Nordion has an established Environmental Protection Program to manage actual and potential environmental aspects resulting from activities, products and services. The program protects health, safety, security and the environment. Our comprehensive programs control and monitor all aspects of our operations that could have a significant impact on the environment, such as those listed on the screen.

As Scott mentioned in his introduction, the Ottawa site has been certified with the ISO 14001 standard of environmental management systems since 2006. Environmental management systems is the framework that helps reduce the risk of non-compliance and improve environmental, health and safety performance, benefitting both employees and the public.

Although having an environmental management system is a requirement of the CNSC *Regulations*, Nordion had gone a step further and voluntarily certified our system, which means it was audited by a third party, BSI,

to confirm conformance with the international standard. As part of this certification, we establish environmental objectives regularly to continually improve our performance. Some of the outcomes we have achieved over the licensing period include:

- Reductions in energy use;
- Reductions in hazardous and non-hazardous waste;
- Reductions in radioactive waste.

We significantly improved our Environmental Monitoring Program at the onset of the current licensing period to monitor and measure effluent releases and environmental contamination. All production operations are contained within cells, glove boxes or fume hoods.

We ventilate air from these containment systems through an extensive nuclear ventilation system comprised of roughing and high-efficiency particulate arrestance, or HEPA, filters and where appropriate activated charcoal filters.

Limits for radioactive emissions are determined by the Derived Release Limit, or DRL. The DRL takes into account the critical pathway analysis and the most probable location of highest radiation exposure.

AS you see on your screen, the upper left chart is using a logarithmic scale and the bottom right

uses a standard scale. Both charts reflect airborne releases from 2005 to 2014.

So what's the story in this chart? Well, it's a positive story. The trend for releases is decreasing and very low to begin with.

Radioactive liquid waste is collected and transported to a licensed radioactive waste management facility. Other waste water from our production area is collected in holding tanks, and then sampled and analyzed to ensure that it is in compliance with license conditions prior to release.

All liquid effluent releases have been below the Nordion action level and well below regulatory limits throughout the licensing period.

Liquid releases over the last five years are below 0.008 percent of the DRL.

We conduct soil and groundwater sampling to monitor environmental contamination. The results of soil sampling conducted over the licensing period indicated that no radionuclides attributable to licensed activities were detected.

Groundwater sampling for non-radiological contaminants demonstrated no significant changes in the groundwater compared to the results of an assessment conducted in 2005.

Regular sampling for radiological contaminants in the groundwater external to the building began in 2013. The results of this sampling determined that only normally occurring ubiquitous radionuclides were detected.

We made the following improvements to our Environmental Protection Program:

- Installed Multi-Channel Analyzers, MCA, to more accurately monitor xenon releases from our molybdenum-99 and xenon-133 processes;
- Installed carbon-14 monitoring equipment to monitor Carbon-14 releases;
- We upgraded the Kanata operations building delay tank level indicators and monitoring systems;
- We restored four groundwater wells and added one new well to improve the sampling for radioactive monitoring; and
- Added additional soil sampling locations in 2010.

The fourth Safety and Control Area is conventional health and safety. As part of this SCA, Nordion has established an Occupational Health and Safety Program to prevent, manage and respond to potential or actual hazards or emergencies in the workplace.

As seen on these charts, using total incident rate and lost time injury rate as indicators, our statistics show that Nordion's results remain considerably lower than the average Schedule 1, Ontario employer rates.

On the left chart, the yellow line illustrates our total incident rate. The green line on the right chart illustrates our lost time injury rate. The blue lines represent the average Schedule 1, Ontario employer rates.

The charts do show a small upward trend in our statistics in 2014. The 2014 number uses a 14-month period as a result of a change in our fiscal year end. Three lower back incidents or ergonomics-related injuries did occur in the last two months of our extended fiscal year, which brings us to our next slide: Improvements in our Conventional Health and Safety Program.

Issues related to lower back and upper body strains have been a challenge in recent years. In 2013 we recognized this and proactively initiated an update to our Back Safety Awareness Training Program. We developed a number of initiatives since that time including:

- We created two 90-second stretch videos to be used by staff at the start and end of shifts;
- We organized a back safety challenge as well as the other improvements listed on this slide.

In addition to updating our Back Safety Awareness Training, in this licensing period we added new programs, procedures and improved our near-miss reporting.

- We added a Job Hazard Analysis Program, a Confined Spaces Program and a Materials Handling Program just to name a few.

Our fifth safety and control area is emergency management. Emergency management includes our emergency response planning which is required to reduce or mitigate operational impacts and potential environmental, health and safety impacts that may occur in the event of an emergency. Nordion has an extensive emergency preparedness program to respond to various types of emergency situations, including on-site and off-site emergencies.

We have a number of Emergency Response Plans, or ERPs, to address various emergency situations and often work in partnership with local fire and police departments. These plans outline response actions to be taken to minimize potential environmental, health and safety impacts. Depending on the nature and scale of an emergency, the appropriate ERP is activated. The ERPs are routinely reviewed, updated, and tested in the form of drills, desktop training exercises and full-scale evacuation exercises.

We are just going to switch slides here for

a moment. Thank you.

As you are aware -- so we are just switching to the deck with the fire slides. I'll just give you a moment to get those.

--- Pause

MR. BEEKMANS: As you are aware, we implemented our ERP on the morning of August 6th. To provide you with a summary of those events, today we have some additional slides to show you.

Just following 10 a.m. on the morning of August 6, some employees identified smoke in our Kanata operations building at our Ottawa facility. An employee activated a fire alarm and all non-emergency response personnel and guests calmly evacuated the building in accordance with our Fire Safety Plan.

Nordion's emergency response personnel identified that the fire was on the roof of the office area within our Kanata operations building. The fire occurred where the roof of the office area connects to a wall section that houses the fan room. This is part of our nuclear facility.

Please see the arrow pointing to this area in the upper left-hand picture. Below and next to where the fire occurred is a combination of production area hallways and the fan room.

The fire department arrived within minutes and were escorted onto the roof and into the building for secondary sweeps of personnel. At this time, we think the fire was a result of maintenance that was being conducted on the roof by a third party. Specifically, they were applying new roofing materials -- see the bottom right-hand photo -- over the existing base layer membrane. This work required the use of blow torches. The roof design is a standard design used in industrial facilities and the maintenance work was routine in nature.

A number of steps were taken immediately to ensure the safety of our employees, the environment and our community and media statements were issued to the community and to our employees providing updates on the situation.

There were no radiological releases and no employees or members of the community were injured as a result of the incident. There was no contamination found in any of the affected areas or in the water used for fire suppression nor on Nordion or city responders or any of their equipment. The fire was contained and extinguished quickly. The building was returned to Nordion's control at approximately 12:45, less than three hours from when the alarm sounded. By the end of the day we had cleaned up any water used to extinguish the fire, confirmed there was no damage to safety systems, and restored the roof integrity

with temporary repairs.

I would like to add that our emergency response went very smoothly, which we attribute to thorough emergency response planning, training, years of practice, and solid collaboration with emergency services.

I am very pleased with the efforts put forward by members of the Nordion team and the Ottawa Emergency Services.

The Nordion team initiated an investigation immediately to ensure we received accurate and timely information. Since the incident occurred on August 6th, we have stopped all hot work on the roof and on the site; started gathering pertinent information through interviews and reviewing of records; engaged third-party experts to assist with reviewing the emergency response, identifying root cause of the fire, and to assist with engineering design of the roof repairs.

Between now and September 4th, Nordion personnel working with input from the third parties will continue their investigation and we will submit an event report within the 21-day time period.

I will now return to the original slide deck that we had provided.

Slide 44: We improved our emergency management program over the current licensing period. We

updated the program model and documents to use the Incident Management System or IMS. We revised the emergency preparedness program. We also made the many improvements listed on the screen.

In the areas of fire protection, we developed and implemented a fire hazard analysis and a fire protection program, a program to conduct routine fire inspections and revise Nordion's fire safety plan.

As a result of implementing the emergency response on August 6th, we are working with experts to determine why the fire occurred and how to continue to improve our emergency response and fire protection programs.

The 6th safety and control area that I will discuss is security. Nordion has a long history of having a strong security program, one that continuously evolves and improves as security threats and regulations change. Over the last decade, we proactively made significant improvements outside the facility, such as security fencing, bollards, and exterior lighting; and we proactively improved equipment, namely our security control centre, alarms, and camera systems, IT network security; and we hired highly trained and experienced security personnel.

The final area that I will review is our

Public Information Program. We launched the Public Information Program in 2006, and as Scott mentioned in his introduction, we greatly expanded the program since the launch. We designed the program to achieve three goals: to build public awareness, to proactively engage identified stakeholders, and to obtain stakeholder feedback and create a two-way dialogue. Since the launch of the program, we used the following vehicles to communicate with our stakeholders: permission-based emails, ads in the local newspaper, and our website.

In this last year we made a significant number of improvements. We expanded our program by adding new vehicles to engage the public, and we increased the visibility and expanded the content of our environmental health and safety section on our website to make it more accessible and understandable to the public.

While we are committed to traditional communication vehicles, we have improved our program with the addition of new ways to share information with and engage the community. We added social media, in-person get-togethers, and surveys to our program. With social media, we get likes on our Facebook page, retweets on our tweets, and shares on our LinkedIn posts. However, it is the in-person meetings and the surveys that are the most successful new vehicles that achieve our goals of engaging

the community stakeholders, obtaining feedback, and creating a two-way dialogue.

In December 2014, we hosted Nordion's community café, an in-person meeting with members of the community. Through a question-and-answer period, participants asked that we publish information about our emergency preparedness plan. And since we cannot take the public on tours, participants also asked for a virtual tour of our facility. In June we published the emergency preparedness plan to our website and we've been working on a virtual tour for the last few months and expect to have it released this fall.

In 2014 we also completed two surveys of people in our local community. I'd like to share some key insights revealed from these surveys. We learned that the preferred communication vehicle is email. We have a positive baseline awareness level and we will continue to increase awareness with the community. Furthermore, of those in the community who are aware of Nordion, the majority rated Nordion's Ottawa facility high on safety, between eight and 10 on a scale of 10.

Nordion is a responsible community citizen with an established, active public information program that builds awareness and engages the public. We plan to continue with the tactics mentioned and we'll continue to

find new ways to improve our program over the coming years.

Thank you for your time.

Scott will now wrap up.

Scott.

MR. McINTOSH: Thank you, Rick.

President Binder, Commission members, and
CNSC staff.

To summarize, Nordion has for over 50 years demonstrated the safe operation of its facility in Ottawa. Our request for a licence term of 10 years or greater is based on our positive compliance history and our safety record. We've demonstrated that we're capable and qualified to operate this facility in a manner that safely protects employees and causes no adverse effects to public or the environment. We've demonstrated repeatedly and consistently that risk has been safely and properly managed.

We take pride in what we do and how we do it, and this includes our commitment to meeting and exceeding environmental, health and safety standards. Should the Commission award Nordion with a site licence for a period of 10 years or greater, I can assure you that we will continue to foresee and anticipate ways to improve our environmental health and safety systems and standards. We will meet and exceed the regulatory requirements identified

by the CNSC. And we will continue to work with CNSC staff and keep lines of communication open.

Thousands and thousands of people depend on Nordion for the critical products we produce and deliver every single day. This includes suppliers, customers, physicians, and their patients. There's a significant benefit to Canadian society and the global health-care community from Nordion's production and supply of radioisotopes for diagnosing and treating disease and for sterilization of medical products and irradiation of fruit products. We continue to be a symbol of the benefits the nuclear industry brings to society.

Thank you very much for the opportunity to present on behalf of Nordion, and we would be pleased to answer any questions you might have.

THE PRESIDENT: Thank you.

Before we get into questioning, I would like to move now to a presentation from CNSC staff. Its outline is CMD 15-H7 and H7.A. I understand that Dr. Newland will make the presentation. Please proceed.

***CMD 15-H7/15-H7.A**

Oral presentation by CNSC staff

MR. NEWLAND: Thank you.

Good morning, Mr. President, members of the Commission. My name is David Newland, and I'm the acting director general of the Directorate of Nuclear Cycle and Facilities Regulation.

I have with me today Mr. Michael Rinker, director of the Nuclear Processing Facilities Division and Senior Project Officer Ann Erdman of the same division.

We also have licensing and compliance staff, including subject matter experts to help answer any questions the Commission may have.

We are here to present Commission member document CMD 15-H7 for Commission consideration of the renewal of Nordion Canada Inc., or Nordion, Class 1B licence.

Mr. Michael Rinker will now continue with the rest of the presentation.

Thank you.

MR. RINKER: Good morning Mr. President and members of the Commission. My name is Michael Rinker and I'm the director of the Nuclear Processing Facilities Division at the CNSC.

The purpose of this presentation is to provide CNSC staff recommendations on a licence application from Nordion for the renewal of its nuclear substance processing facility operating licence.

To support the CNSC staff recommendation, we will present background information on the Nordion facility and its operations, highlights of CNSC oversight of this facility, and the performance of the facility over its licensing term, areas of regulatory focus and other matters of regulatory interest, and finally we will present the proposed licence and licence condition handbook as well as CNSC staff recommendations to the Commission.

Nordion Canada Inc., or Nordion, is a health sciences organization providing products used in the prevention, diagnosis, and treatment of disease.

Nordion has two business units, Gamma Technologies, that provide cobalt-60 sources used in cancer therapy and irradiation technologies, and second, Medical Isotopes, providing radioisotopes used in nuclear medicine. Nordion is a global supplier of these products.

Nordion currently possesses a nuclear substance operating licence to operate a Class 1B nuclear substance processing facility. Nordion is authorized to import, process, and possess many radioisotopes at their facility.

The current licence was issued for a 10-year period after a public hearing in 2005. This licence expires October 31st, 2015, and Nordion has applied to renew this licence.

The Nordion facility is located in a business park adjacent to a residential area in the Kanata suburb of Ottawa. Cobalt-60 has been processed at this facility since the early 1970s, and the other radioisotopes have been processed since the early 1980s.

In its review, CNSC staff considered the licence application and all other information submitted to support the application. In addition, CNSC staff assessed Nordion's past performance and its compliance history with the regulatory requirements.

In general, Nordion's compliance record over the past 10 years has demonstrated a commitment to safety.

The CNSC has a clear and robust regulatory framework in place to ensure the continued safe operation of all nuclear facilities. Regulatory oversight is provided to ensure licensees operate the nuclear facility in a safe manner in compliance with the regulatory requirements of the *Nuclear Safety and Control Act* and its regulations, as well as licence conditions imposed by the Commission.

Regular inspections and evaluations verify that licensees are complying with the laws and regulations, as well as the conditions of their licence. In this way the CNSC can assure licensees are operating safely and adhering to the regulatory requirements.

A licensee such as Nordion is also required to submit to the CNSC annual compliance reports that demonstrate how Nordion complied with regulatory requirements in all safety and control areas.

CNSC staff continue assessing Nordion's performance in each of the 14 safety and control areas and reports Nordion's performance annually to the Commission in regulatory oversight reports.

I will now pass the presentation to Ann Erdman, the Senior Project Officer, who has been responsible for regulatory oversight of the Nordion facility during the complete and current licence period.

MS ERDMAN: Mr. President and Members of the Commission, my name is Ann Erdman and I am a Senior Project Officer in the Nuclear Processing and Facilities Division.

This table shows the number of inspections CNSC staff conducted at Nordion's facility and the number of person days CNSC staff spent on all compliance and licensing activities. CNSC staff spent approximately 1,200 person days of effort over the licencing period and conducted 33 inspections.

In this next slide is the number of enforcement actions found during inspections conducted at Nordion. CNSC staff issued 49 enforcement actions. There are 11 open enforcement actions with Nordion at this time,

the majority of them resulting from three inspections conducted this year in January, February and June. The majority of the open actions are considered to be in areas where improvements could be realized to improve programs at the facility, rather than non-compliances.

Nordion has proposed target completion dates for all enforcement actions. CNSC staff have reviewed the dates and agree with them. None of the open enforcement actions are such to pose an unreasonable risk to workers and the public and none of the enforcement actions that remain open are an impediment to re-licensing Nordion.

Nordion's performance in all safety and control areas during the licensing period has remained satisfactory to fully satisfactory. Nordion has effectively implemented and maintained all of their safety and control programs which has resulted in nuclear energy workers at the facility and members of the public receiving radiation doses well below regulatory dose limits. Radiological releases were also well below regulatory limits.

During the licence period there were a number of incidences in which exposures exceeding the dose limit of 1 mSv per year were recorded on dosimeters worn by contractors working at Nordion. In response to the elevated dosimeter results the licensee, Nordion,

investigated and determined that in all cases the majority of the dose recorded on the dosimeters was non-personal and that no contractor worker personally received a dose of radiation in excess of the regulatory dose limit.

In two of these instances the licensee did not file a dose change request to correct the information in the National Dose Registry.

As further described in the CMD and to ensure transparency, these dosimeter results have been included in the dose statistics presented in staff CMD that you have.

The licensee has reviewed the manner in which contracted dosimetry is managed and has made improvements to their program. CNSC staff are satisfied that doses to workers, including contractors, are below regulatory limits.

CNSC staff conclude that Nordion will continue to make adequate provision for the protection of the environment, workers and the public.

This table presents Nordion's performance in all 14 safety and control areas over the licensing period. Overall, the safety and control area ratings have been satisfactory. Since 2011 fully satisfactory ratings have been given in the areas of the conventional health and safety, environmental protection and security. The fully

satisfactory rating for environmental protection is largely attributed to Nordion's continued effective management of its environmental protection program.

For conventional health and safety, the rating was raised in 2011 due to Nordion's continued excellent implementation of its health and safety program and low number of lost time incidents.

This table also shows that since 2012 Nordion has received a fully satisfactory rating in the area of security. CNSC staff observe Nordion continuing to improve and enhance their security program and its compliance history has been excellent in this area.

Nordion has implemented and maintained an effective radiation protection program as required by the Radiation Protection Regulations. The majority of workers at Nordion have been designated as nuclear energy workers, NEWs, in accordance with the Radiation Protection Regulations. Radiation exposures are monitored to ensure compliance with the CNSC's regulatory dose limits and with keeping radiation doses as low as reasonably achievable.

Throughout the current licensing period, no nuclear energy worker's radiation exposure exceeded the CNSC's regulatory dose limits. The maximum effective dose received by a worker in the current licensing period was 7.8 mSv, or approximately 16 per cent of the regulatory

limit of 50 mSv in a one-year dosimetry period. CNSC staff are satisfied that Nordion's doses to workers are being controlled well below the regulatory limits and are maintained as low as reasonably achievable.

The information on this slide is for a member of the public outside of the facility. Nordion's environmental releases have resulted in low doses to the public over the licence period. Using Nordion's emissions, the maximum calculated dose of .041 mSv occurred in 2007 and values have decreased to .01 mSv in 2014. The trends reflect differences in production, additional monitoring of xenon gases commencing in 2007, plus that Nordion has discontinued its carbon 14 production.

Based on the review of dose data, CNSC staff were satisfied that Nordion is adequately controlling radiation doses to members of the public to levels well below regulatory limits.

CNSC staff have rated the conventional health and safety SCA at Nordion as fully satisfactory since 2011 based on the effective implementation of its conventional health and safety program.

In 2013 Nordion was the gold winner in the manufacturing category for Canada's safest employer's award. CNSC staff lowered the rating in 2014 to satisfactory as there were lost time incidents that were

related to back injuries. Nordion acknowledged a need to improve in this area and have planned and are carrying out additional initiatives on back safety. CNSC staff find the actions taken by Nordion to be acceptable.

During the licensing period, Nordion continued to demonstrate its ability to keep workers safe from occupational injuries.

Nordion's releases to the environment continue to be effectively controlled and are consistently well below the release limits prescribed in the operating licence. Nordion monitors groundwater, takes soil samples and also measures gamma exposures around the facility. All results indicate that Nordion continues to protect the public and the environment.

There are environmental release limits in Nordion's licence that ensure the public and environment are protected. These limits are calculated derived limits, or DRLs, that reflect the total releases from each individual isotope that ensure the public dose of 1 mSv per year is not exceeded.

Nordion is revising its DRLs to align with an updated standard from the Canadian Standards Association. This document is in its final stages of review. The revised DRLs for atmospheric emissions will include the three additional isotopes: Xenon-135, Carbon-14

and Xenon-135M that Nordion started to monitor during the licensing period.

Nordion continues to monitor all liquid release from the facility. This slide, table shows the radioisotopes monitored and released from the facility compared to the licence limits. All releases are a small fraction, less than .01 per cent of the licence limits.

The CNSC Staff conclude that liquid effluent from the facility continues to be effectively managed. Nordion continues to monitor all emissions to the air from the facility. This slide shows Nordion's monitoring results compared, again, to the licence limits.

In 2007 Nordion began monitoring three additional parameters; Carbon-14 gas, Xenon-135, and Xenon-135m. As Nordion's environmental releases are minimal, they resulted in very low doses to the public over the licence period.

As mentioned earlier in the presentation, the calculated annual dose to the public from all releases of radionuclides from the facility over the past 10 years is .041 mSv in 2007, well below the public dose limit of 1 mSv per year.

Note the reduction of Xenon emissions in 2010 in this slide. This was when the reactor at Chalk River was shutdown and the production and supply of

radioisotopes was impacted.

Over the next licensing period, there are two areas of regulatory focus. As part of CNSC's Independent Environmental Monitoring program, CNSC Staff will be carrying out monitoring in 2016 around Nordion's facility. Samples will include air, soil, and vegetation. There results of this program will be made publicly available on the CNSC website.

Another area of focus will be Nordion's implementation of Canadian Standards Association, CSA Standards, and CNSC Regulatory Documents, REGDOCs.

This table identifies the various documents that Nordion will be implementing during this next licensing period. Nordion was requested to form a gap analysis of their various documents against their current programs and identify dates to implement the changes. The licence condition handbook that is proposed with the licence include the implementation dates that Nordion has proposed.

Although Nordion has some gaps in their programs compared to these published standards and regulatory documents, Nordion's current programs continue to be satisfactory to protect the public and the environment.

The publication of standards in regulatory

documents are to clarify CNSC requirements as part of ongoing improvements.

Let us move now to other areas of regulatory interest.

Aboriginal groups previously expressing interest in being kept informed of CNSC licensed activities occurring in traditional territories were sent letters in 2015, in January, providing them with information regarding the licence renewal application, the opportunity to apply for participant funding and details regarding the Commission's public hearing.

No groups applied for funding or e expressed an interest in participating in the license renewal hearing.

Nordion is in good standing with respect to the cost recovery fees regulations requirements.

And Nordion's public information and disclosure program meets all requirements and intentions outlined in the CNSC RDGD 99.3 document public information and disclosure.

CNSC Staff has observed that Nordion has demonstrated a commitment to establish an atmosphere of openness and transparency regarding the health and safety of the public and the environment as it relates to its licensed activities.

A key area of Nordion's business is manufacturing risk-significant radioactive sealed sources and exporting them globally. Nordion must obtain a separate export licence issued by a CNSC-designated officer to export a source such as this and report to the CNSC after the source has been exported.

From 2010 through 2014 repeat non-conformances were identified where Nordion failed to provide this post-shipment verification within the required timeframe.

In September 2014, Nordion was issued an administrative monetary penalty for failing to comply with a condition of an export licence in relation to the submission of the post-shipment verifications. Nordion paid the penalty in nine days. And there have been no non-conformances of this nature since the issuance of the administrative monetary penalty.

As part of Nordion's corrective actions to address the repeat non-conformances Nordion commissioned a capital project to develop an IT solution to utilize their existing corporate network to pull required data and automate as much of the prior and post-shipment notification process as is possible to reduce the risk of human error to near zero.

Nordion consulted CNSC Staff during the

project and Staff, CNSC, is currently assisting Nordion during the final testing phase. Full implementation of this corrective action is to occur September 9th.

CNSC Staff is satisfied with the proposed corrective action and will continue to monitor Nordion to ensure future compliance with their export licence conditions.

As part of this renewal, Nordion has requested an update to their financial guarantee. Nordion currently has a standby letter of credit for \$15,400,000. The Commission accepted this guarantee in 2006. Nordion continues to maintain the letter of credit which will remain valid until the revised financial guarantee is put in place.

Recently, Nordion has provided and updated the revised cost estimate and decommissioning strategy. It was reviewed by CNSC Staff, and the estimated cost to decommission the facility has increased to over \$45 million. Nordion has proposed to fund the financial guarantee in the form of a letter of credit for approximately \$45 million, that includes \$12 million to put it into a safe state of closure, and a second financial instrument in the form of a surety bond for \$20 million.

CNSC Staff have reviewed the financial instruments and conclude both the letter of credit and

surety bond meet the applicable regulatory requirements under the NSCA.

Regarding the proposed licence, CNSC Staff is proposing a licence that includes standard licence conditions handbook that make reference to licensee programs, compliance verification criteria such as specific CNSC regulatory documents, CSA Standards, and recommendations and guidance.

Before moving on with the presentation, please note a correction to the draft licence. The draft licence requires an additional licence condition. Licence condition 14.1 should read, "The licensee shall implement and maintain a safeguards program." Therefore, licence condition 14.1 found in the proposed draft licence attached to the CMD becomes licence condition 15.1.

Regarding the licence length, CNSC Staff is proposing that the Commission renew Nordion's licence with the same 10-year licence period expiring October 31, 2025.

CNSC Staff have considered Nordion's request for a longer term licence, longer than 10 years, in the context of their compliance performance relative to other licensees.

While Nordion's compliance history has been good over the current licence period, their performance has been similar to other strong performing licensees also

having 10-year licence periods.

Another item factoring into CNSC Staff's recommendation is that Nordion will also be updating several of their programs as it transitions to the currently published CNSC REGDOCs and CSA Standards.

Nordion's compliance history, together with the transition to the REGDOCs and Standards is the basis for CNSC Staff's recommendation that the Commission issue Nordion a 10-year licence.

This concludes my portion of the presentation. I will pass the presentation now back to Dr. Newland.

DR. NEWLAND: Thank you. Based on the assessment of Nordion's safety performance, CNSC Staff conclude that as per section 24(4) of the *Nuclear Safety and Control Act* Nordion is qualified to carryout the activities authorized by the licence.

In carrying out those licensed activities, Nordion has made and will continue to make adequate provisions for the protection of the environment, the health and safety of persons, and the maintenance of national security and measures required to implement international obligations to which Canada has agreed.

CNSC Staff recommends, pursuant to section 24 of the *Nuclear Safety and Control Act*, the Commission

renew the nuclear substance processing facility operating licence NSPFOL-11A.00/2015 for a 10-year period. And pursuant to section 24 of the *Nuclear Safety and Control Act*, the Commission accept the revised financial guarantee.

We now have a very short presentation with respect to the fire at Nordion, and Mr. Rinker will continue. Thank you.

MR. RINKER: As we have heard from Nordion, at approximately 10:00 a.m. on August 6 a fire occurred on the roof of Nordion's Class 1B facility. Nordion implemented its Emergency Response Plan within five minutes of the fire alarm and was in direct contact with the CNSC Project Officer once emergency measures were initiated.

Ottawa Fire Services were quickly on scene and extinguished the fire. And as part of the emergency response, Nordion installed a plug as shown in the bottom left photo that ensured alarm activated sprinkler water and water from the fire department for fire suppression did not reach a local creek. There were no impacts to persons nor to the environment and no one was injured.

Nordion ensured that the building was safe before Nordion staff were permitted to re-enter. All ventilation and safety systems, including radiation protection monitoring equipment, security and fire protection systems were checked to ensure that they were

functioning and performing as required before recommencing operations.

The roof, as shown in the top photo, was temporarily repaired with a patch as shown.

The bottom photo shows air monitoring equipment for radionuclides. Air samples and water samples confirmed that no nuclear substances were released by this event.

Nordion has temporarily ceased roofing maintenance that requires the application of heat. The root cause of the fire and the effectiveness of Nordion's emergency response are currently being investigated. Corrective actions, if needed, will be determined as a result of this investigation.

The CNSC, as did Nordion, informed this event to the general public with updates provided on our website and the use of Twitter.

Next steps by the CNSC will be informed by the review of a report on this event that must be submitted by Nordion by September 4th of next month.

CNSC staff will update the Commission of this event at a public presentation of the 2014 Regulatory Oversight Report for Uranium and Nuclear Processing Facilities that is scheduled for the September 30-October 1 meeting of the Commission. Thank you.

MR. NEWLAND: Thank you.

That concludes staff presentations and we are available for any questions that the Commission Members may have. Thank you.

***CMD 15-H7.13**

Oral presentation from Lantheus Medical Imaging

THE PRESIDENT: Okay. Before opening the floor for questions, as per normal practice, I would like to move to an oral presentation by Lantheus Medical Imaging, as outlined in CMD 15-H7.13. I understand that Mr. Villeneuve will make the presentation.

MR. VILLENEUVE: Yes.

THE PRESIDENT: Please proceed.

MR. VILLENEUVE: Thank you.

Members of the Commission and interested citizens, thank you for the opportunity to provide an industry perspective on the licence extension request for the Nordion facility in Kanata, Ontario.

My name is Cyrille Villeneuve and I am the Vice President International for Lantheus Medical Imaging.

Also present with me here is Mr. Ira Goldman, Senior Director, Global Strategic Supply and Government Relations for Lantheus.

I am here today to express Lantheus' support for Nordion's relicensing application to operate its nuclear facility in Canada given its continuing important role in producing critical medical isotopes for nuclear medicine procedures for patients in Canada, North America and globally.

I will provide a brief overview of Lantheus Medical Imaging and our Canadian operation and then detail the reasons we support Nordion's request.

Lantheus Imagerie médicale est une entreprise de calibre international dont le siège social se trouve à North Billerica, au Massachusetts. Elle se spécialise, entre autres, dans la fabrication et distribution de produits d'imagerie médicale pour le diagnostic des maladies cardiaques et vasculaires.

Depuis plus d'un demi-siècle, l'entreprise et ses prédécesseurs ont été des chefs de file de l'industrie de l'imagerie médicale en médecine nucléaire.

Parmi les produits lancés sur le -2- marché, on compte le générateur TechneLite, qui produit du technétium, et d'autres agents d'imagerie d'avant-garde comme le thallium et le Cardiolite, qui sont tous deux utilisés en médecine nucléaire pour diagnostiquer les patients atteints de maladie cardiovasculaire.

Lantheus compte plus de 500 employés. Notre

entreprise est entièrement intégrée, possède des installations de fabrication de classe mondiale et compte sur un solide réseau de distribution. Nous menons nos activités à travers le monde avec une présence directe aux États-Unis, au Canada, à Porto Rico et en Australie.

Au Canada, Lantheus emploie plus de 70 personnes et son siège social de Montréal compte notamment du personnel en ventes et en marketing, des représentants en service à la clientèle et des employés de radiopharmacie. De plus, Lantheus exploite quatre radiopharmacies au Canada, dont une à Québec, à Montréal, à Mississauga et à Vancouver, où sont préparées des doses à usage unique, appelées « unidoses », que l'on distribue deux fois par jour dans les départements de médecine nucléaire des hôpitaux et des cliniques des environs.

Lantheus compte sur l'isotope molybdène 99 (Mo 99) à des fins médicales pour fabriquer son générateur TechneLite et produire un « isotope de filiation » appelé le technétium 99m (Tc 99m). Le Tc 99m est l'isotope pour l'imagerie médicale le plus utilisé dans le monde. Les générateurs TechneLite sont distribués au Canada et à travers le monde dans des hôpitaux et des radiopharmacies comme source de technétium.

En 2009-2010, pendant l'arrêt prolongé du réacteur NRU, Lantheus a fait tout en son pouvoir pour

répondre aux besoins de ses clients et de la communauté médicale au Canada et aux États-Unis. Nous avons élargi notre réseau de fournisseurs de Mo 99 afin de réduire notre dépendance à l'égard du réacteur NRU. Nous avons modifié les calendriers de fabrication afin de pouvoir utiliser le maximum de Mo 99 disponible. Nous avons prolongé les heures de travail de nos radiopharmacies pour permettre une production en soirée et les fins de semaine afin de maximiser la quantité de technétium disponible en unidoses. Nous avons augmenté substantiellement la production de thallium à partir de nos cyclotrons pour en faire un produit d'imagerie cardiaque de remplacement. Nous avons travaillé en étroite collaboration avec nos clients afin de les tenir au courant de la situation de l'approvisionnement par l'entremise de communications directes et de mises à jour affichées sur notre site Internet, www.lantheus.com.

Au Canada, nous avons travaillé en étroite collaboration avec Santé Canada et les autorités provinciales de la santé pour assurer une distribution aussi équitable que possible des unidoses à base de technétium, pour faire en sorte que le plus grand nombre possible de patients puissent être traités.

Depuis la remise en service du réacteur NRU en août 2010, Lantheus continue à travailler afin de renforcer et d'élargir sa chaîne d'approvisionnement de Mo

99 à l'échelle mondiale de façon à assurer un approvisionnement continu et fiable de Mo 99 pour ses activités de fabrication de TechneLite, ceci au bénéfice de nos clients et nos patients au Canada et dans d'autres régions du monde.

Nordion continues to play a critical role in international medical isotope production within industry efforts since 2009 to provide a reliable source of Mo-99. As a result, Lantheus strongly supports the request of relicensing Nordion (Canada) facility for the following reasons.

While other Mo-99 providers have increased production over the past several years, Nordion, together with the NRU reactor, is still a very important contributor to global Mo-99 supplies. Its continued operation helps to ensure a stable and adequate international supply of Mo-99.

Nordion is the only Mo-99 producer in North America and thus plays an especially important role in meeting the nuclear medicine needs of Canada and this continent even if increasing amounts of product required for North America are imported from abroad. This is particularly important when there is a disruption of long-distance international air transport as we saw with some natural event like the Icelandic volcanic eruption or other similar situations.

While Nordion produces a smaller proportion of the regular weekly world requirement of Mo-99 now than it did two years ago, its substantial production capacity provides an important "outage reserve capacity" in the event one of the other major producer reactors has a lengthy scheduled or unscheduled outage. That was particularly important in late 2013 and the first four months of 2014 when the Mo-99 processing facility in both NTP in South Africa and Mallinckrodt in The Netherlands had unscheduled outages.

Nordion's production capacity near Ottawa and relative proximity of Lantheus TechneLite manufacturing operation near Boston permit substantial flexibility to meet short-term market requirements due to a last-minute customer requests stemming from Mo-99 supply disruptions as a result of production, logistics or transport issues that can impact the other major suppliers that are not in North America.

The Government of Canada announced in February 2015 that the NRU reactor will continue to operate -- assuming relicensing by the CNSC -- from 2016 to 2018 and that in case of an unexpected significant global shortage of Mo-99, the NRU may temporarily resume production of Mo-99 as an emergency measure. In order for NRU to serve this purpose, the Nordion facility at Kanata

will also play an important role and will need to maintain operational status.

A variety of research and development efforts on Mo-99 and Tc-99m production projects have been underway in Canada, in the U.S. and in other countries to establish new sources of Mo-99 or to produce Tc-99m directly. Almost all of these projects have experienced delays in regard to their planned commercial operation and continue to face some technical, financing and regulatory challenges. At this time it is not clear how many, if any, of these projects will succeed and come to the market.

Nordion announced also a project in February 2015 to establish new Mo-99 production via the Selective Gas Extraction method together with the University of Missouri research reactor and General Atomics. Nordion's facility at Kanata will play an important role in this new Mo-99 process and thus needs to be relicensed in order for Nordion to pursue this attractive alternative technology approach for Mo-99.

Nordion continues to serve an important role in our Mo-99 supply chain, currently providing a significant portion of LMI's requirements in addition to the Mo-99 that we obtain from other suppliers like ANSTO in Australia, IRE in Belgium and NTP in South Africa.

En conclusion, Lantheus estime que Nordion

continuera de jouer un rôle essentiel dans la production de Mo-99 pour les marchés canadiens et internationaux, non seulement pendant la période restante de production régulière d'isotopes médicaux en provenance du réacteur NRU -- jusqu'au 31 octobre 2016 -- mais aussi bien au-delà de cette période.

Lantheus soutient les efforts financiers et réglementaires du Gouvernement du Canada pour veiller à ce que le réacteur NRU fonctionne en toute sécurité et de manière fiable afin de répondre à la demande en isotopes au Canada et dans le monde. Nous souhaitons que ces efforts se poursuivent afin de développer d'autres sources de production de Mo-99 et de Tc-99m.

Puisque l'équipe internationale de Lantheus est située à Montréal, l'entreprise compte de nombreux clients importants au Canada. Nous sommes pleinement engagés à servir le marché canadien et nous continuerons à faire tout en notre pouvoir pour assurer au Canada un approvisionnement stable, fiable et adéquat en isotopes médicaux, y compris des isotopes issus de nouvelles technologies.

7

Lantheus Imagerie médicale est déterminée à travailler de concert avec ses clients, les patients que nous desservons, nos fournisseurs et les organismes gouvernementaux pour

assurer une réponse aux besoins de la médecine nucléaire au Canada. Nous croyons que le renouvellement de la licence d'établissement de Nordion sera très important dans nos efforts visant à soutenir les besoins du Canada en Mo-99 à moyen et à long termes.

Nous vous remercions de nous avoir accordé cette tribune aujourd'hui. Nous vous en sommes grandement reconnaissants et nous nous ferons un plaisir de répondre à vos questions.

LE PRÉSIDENT : Alors, merci beaucoup pour cette présentation.

Questions? Des questions pour Lantheus?
Seulement pour Lantheus.

Monsieur Tolgyesi?

MEMBRE TOLGYESI : Oui. Merci, Monsieur le Président.

On page 2 of your presentation you were saying that you increased substantially thallium production from your cyclotrons. Could thallium be considered a substitute for technetium?

MR. VILLENEUVE: We did that during the NRU outage as an alternative. Thallium is a technology that was used many years ago and it's certainly not the ideal way today because technetium is a superior technology to that. But at the time, considering that no technetium was

available at the level it should, we did that. But today I believe that other technologies should be far better than thallium, including technetium.

MEMBER TOLGYESI: You were saying also that NRU is one of your main suppliers. Could you tell us what was the proportion of the source of NRU to you prior to outage and what is it now?

MR. GOLDMAN: Good morning. Thank you. Prior to the NRU outage, the NRU was virtually our exclusive source of supply. We had just begun sourcing Moly-99 at that point from NTP, but NRU and Nordion were virtually our entire source of supply. At this point we have four suppliers, as Cyrille noted, and they are, I would say, roughly equally balanced. We have sought to have a balanced supply chain for Moly-99. So there is some variation, you know, depending on times of the year but they are in rough equivalence.

MEMBER TOLGYESI: My last one. On page 3 of your presentation, you were mentioning unscheduled outages at actual facilities. You were talking about new projects are experiencing delays and facing technical, financial and regulatory challenges. Does it mean that there could be a Moly shortage once NRU is closed in 2018?

MR. GOLDMAN: Thank you. Lantheus has made significant efforts in recent years, as I noted, to create

a globally diversified and balanced Moly-99 supply chain. During the annual NRU maintenance outages that have occurred over the past three years, we have been able to meet all of our standing order demand from alternate Moly-99 suppliers, which is NTP, ANSTO and IRE.

In addition, however, as we have noted, during the past several years there have been periods of time when one or more of the Moly-99 processors or certain reactors in the supply chain have had lengthy unscheduled outages, but by and large there have been no periods of meaningful or sustained shortages of technetium during these periods of time.

Lantheus is confident that we will be able to provide reliable and secure supply of our TechneLite generators after the NRU halts routine production of fission isotopes as we will be able to source sufficient supplies of Moly-99 from ANSTO, IRE and NTP, who are working to increase their available capacity to meet market demand in that period.

By example, we have proven our ability to satisfy our own customer demand during the routine NRU outage shutdown periods over the past three years, which we have navigated without any substantial shortages.

While we believe there is likely to be less spare capacity in the supply chain until new producers

reach a market, we expect that there will be sufficient supply.

In the next few days we think the OECD, the Organization for Economic Cooperation and Development, will release its latest assessment of the projection of supply and demand for the future supply of Moly-99 over the next five years or so and we believe that that analysis will provide a certain amount of, I think, confidence that while there are some challenging periods ahead there are unlikely to be sustained shortages as long as there aren't unexpected outages of the major facilities.

THE PRESIDENT: I would like some clarity. I'm not sure I understood. The NRU will stop operating in November 2016. My understanding is that it is available to operate to 2018 only if necessary. You are a global kind of a company. Do you believe there will be shortages as of November 1st, 2016?

MR. GOLDMAN: We do not believe that there will be shortages as of November 1st, 2016. We are pretty confident that, as I said, barring any unforeseen outages of some of the major facilities, the system will be well supplied. There could be short periods when supply and demand are roughly in equivalence but we don't expect significant outages.

We do think that the Canadian government's

offer of having the NRU available as a potential emergency backup is a very important and helpful step. There still needs to be, I think, work done in order to numerate when that might be employed. We do think it's useful but we are hopeful and confident that it probably won't be necessary.

THE PRESIDENT: Thank you.

Question? Dr. McEwan?

MEMBER MCEWAN: Just I guess a follow-up question to that. You note in your letter that not only is the reactor component important in the supply of molybdenum but also the processing capacity. So over the two-year period where the NRU is on standby, are you confident that the processing capacity skill set can be maintained? This is not something that can be switched on and switched off, it's not something that can be ignored in terms of maintenance, so I have always had a struggle to understand how that circle is squared.

MR. GOLDMAN: I think, as I mentioned, the OECD report is going to be public -- it may be already today, I don't know -- in the next few days and there are extensive graphs in that report that show different scenarios in terms of what's happening in the next few years for both the radiation and the processing side.

I would note that, as has been understood in the past few months, the ANSTO facility is going to be --

the existing ANSTO facility in Australia will be upgrading its processing capacity beginning already middle of next year and that's even before they are bringing on a new processing facility which will further increase their capacity up to about 3500 curies per week of an estimated global demand of about 9000 curies per week.

Also, IRE has received permission to increase their capacity by about a factor of 50 percent and that will be available beginning I think already this fall.

So even though there will be one less active processing facility, we think that the processing facilities that will be operating, because they have increased capacity or are increasing capacity, will be able to address the demand.

THE PRESIDENT: Nordion, do you want to add anything to this projection?

MR. BURNETT: Yes. Tom Burnett. I am the President of Medical Isotopes for Nordion.

I have seen the OECD report as well and I think in terms of capacity increases at different processors, these are based on plans with the facilities that require changes as well as regulatory approvals. So although the plans are being put forward, there is an element of risk always around these actually coming to fruition.

What we have seen over the last few years if we look at what the regular capacity is, it was more than sufficient, but incidents happen. Unforeseen shutdowns do happen and there has been a track record of them happening over the last seven years. It's when those situations happen that it's the outage reserve capacity you need to examine to determine will the market be properly supplied.

Under regular circumstances, yes, things look like they will be sufficiently supplied. I haven't seen a period of regular circumstance for the last seven years.

THE PRESIDENT: Thank you. Any other questions? Autres questions pour Lantheus?

Alors, merci beaucoup. Thank you. Thank you very much.

I would like to take a 10-minute break and then we will get into some question period. Thank you. So we will be back at 10:45.

--- Upon recessing at 1035 / Suspension à 1035

--- Upon resuming at 1048 / Reprise à 1048

THE PRESIDENT: Okay. We will now open the floor for the first round of questions and I will -- actually, all rounds of questions from the Commission Members and I would like to start with Madame Velshi.

MEMBER VELSHI: Thank you, Mr. President.

That's accurate.

I want to ask both staff and Nordion about the term of the licence, your request of 10-plus years, the initial of 20 and staff's recommendation of 10 years. I know both of you in your considerations on what should go into determining the term of licence is your track record, safety record, your compliance history and I guess even the maturity of the programs, and something that I think staff talked about was you also do a bit of comparison with other licensees in determining what is appropriate.

Are there other factors? And tell me what the peer group is that you look at to see what is an appropriate term of licence because then I have some fairly specific questions on those considerations that I would like to pursue. We will start with Nordion first then.

MR. McINTOSH: Okay. Scott McIntosh, for the record.

We initially considered a 20-year licence term appropriate and we did that after considering a lot of things, all the things you referred to, its track record, its strength of programs and so on. It is confidence and an independent body, the staff at the CNSC affirming that the strength of our programs is really the ability to evolve as standards change.

And, you know, gaps are found -- we still rely on human beings of course -- and we fix those problems. We do that routinely and we do it well, in our view, but it's based on something else.

The oversight regime in the last 10 years has changed markedly and so, as standards have risen over time, so has the frequency and depth of interaction with CNSC staff. So we now have annual reviews. We now have -- if you noticed on the one slide that was presented by staff, the frequency of interactions has changed dramatically from 2005 to -- probably 2012 is when it really started to ramp up, or 2011, but by 2015, really dramatically different from 2005.

Our contention would be that the licensing term is a little irrelevant, not to be too flippant about it. It could be continuous and that CNSC staff has an oversight regime that appears to us to be pretty comprehensive on a continuous basis. It's not periodic any longer.

So although there may be some fear that if you granted us a 20-year licence, for instance, you might not see us for 20 years or, you know, a review period would be every five years, well, that's no longer the case. We have an expectation that oversight and interaction with CNSC staff will be continuous. That will not change, we

believe, and a 20-year licence term is therefore very possible.

One element that appears, in our view, to be missing from that, you know, I will call it continuous or evergreen licence term is the opportunity for public to interact with the Commission and to make a presentation and that could merely be -- those opportunities could be created periodically within whatever licence term you choose to grant.

So in our view, it's not just -- it's certainly not a peer comparison that's the sole basis for us. That wasn't one of our real big concerns. We were conscious of peers of course but that wasn't one of our big considerations. It was really the change in interactions with CNSC staff and our maturing programs that give us confidence that we could do this on an ongoing basis.

Does that help?

MEMBER VELSHI: That's very helpful, thank you very much. Staff?

MR. RINKER: Mike Rinker for the record. I guess there's a couple of points.

One is, I think, over the last 10-year licence term we did see a considerable improvement in performance from Nordion in around the mid-term of the licence where you saw the appearance of some fully

satisfactory ratings where we didn't see that before. I think we attribute that probably largely overall to the implementation of a very sound management system, moving from a QA program that was just getting implemented at the time of the issuance of licence and evolving to a management system several years later. So having a corrective actions program in place with management part of those decisions, we did observe very strong improvement in performance over the licence term.

Nevertheless, when staff consider what to recommend to the Commission, we are cognizant of discussions we have had with the Commission at other times, such as when the regulatory document for periodic safety review was presented to the Commission and the discussion of longer licence terms versus 10 years or shorter was discussed.

We are also cognizant of, I think, the performance of the licensee over its compliance history, and that is a big weighting factor that we take into account, and I would say that Nordion is a very good performer but much like other very good performers that currently have 10-year licences.

So I think the recommendation is consistent with recommendations we made in 2012 for the Blind River Refinery or Cameco fuel manufacturing. Good performers

have 10-year licences now. You know, the compliance history was weighted similarly.

I think, finally, we would think it would really have to be something exceptional for us to recommend something that would be longer than 10 years. And I want to make sure it's clear that we think Nordion is -- we are quite happy with its compliance record, but are they exceptional compared to the rest of the industry, I would say, no, they are much like the other very good performers.

So that's where we went with the 10-year licence recommendation.

MEMBER VELSHI: So, Nordion, a question for you. What was the level of effort required to go through a relicensing?

MR. McINTOSH: I can probably take this. I am perhaps not the closest to the process among the team but I will do my best.

It is approximately one year of intensive effort to prepare for the relicensing process, a very intensive effort. So the effort is ongoing, first of all, but this particular process takes about one year of intensive effort from the environmental health, safety and compliance team as well as support engineering groups.

MEMBER VELSHI: So from a full-time equivalent perspective, how many would that be

approximately?

MR. BEEKMANS: Rick Beekmans for the record.

So that would be somewhere between three and four FTEs over the past year and we also expect that same level of effort in the upcoming year to bring our programs in alignment with the new requirements which have been posted as part of our LCH.

The other thing I just wanted to mention with respect to the last discussion is really about the LCH and the new form of the licence and picking up on something that Scott said.

You know, the new licence is a very dynamic licence as opposed to the licence that we currently have today in that to make changes to that licence or any of the requirements on that licence is much more challenging in that, you know, we need to get together and sit in meetings like this to make those kinds of changes.

The new licence, the LCH, through our discussions with the staff, will be reviewed and updated on an annual basis and will be part of that review. So it is going to be a very dynamic licensing period and through those discussions and those interactions we are going to be getting continuous feedback and understanding of the new requirements. So it really becomes independent of the licence itself. The licence really primarily names the

term.

MEMBER VELSHI: Thank you. Staff, from staff`s perspective, what is the level of effort? Because in that same slide I know in the last two years the level of effort for this licensee has gone up and I don't know if it's tied in with the licence renewal or not. But approximate number of FTEs with the licensing process?

MR. NEWLAND: Dave Newland for the record.

So for us, it would probably be around two FTEs, two full-time equivalents over and above our compliance work that would be required for licensing.

MEMBER VELSHI: Okay. Thank you.

MR. NEWLAND: And that of course would be reflected in the licence fees as well.

MEMBER VELSHI: Thank you.

THE PRESIDENT: I saw in your presentation, Nordion, that you keep talking about increased regulatory burden. And I think, if I understood and read in between the lines about LCH, the LCH was designed to provide clarity, if I understand correctly, on how the regulator will assess compliance. Yet, in many cases you keep talking about that it's an increased or new requirement. Do you see the new requirement because of the LCH or just a better articulation of the requirement, existing requirement?

MR. BEEKMANS: Rick Beekmans for the record. So I will answer that in two ways.

So over the past licensing period, one of the things that we wanted to illustrate to you is that we have been very proactive around meeting requirements and putting programs, environmental health and safety programs, security programs, safety programs in place in advance of any new requirements being put forward. So really the effort -- there are probably two efforts with respect to the LCH.

There is some alignment required. So when we originally developed our programs, which were greater than the regulatory requirements, we didn't specifically follow the guidelines and the standards that had been quoted. So over the next year and a bit we are going to be spending time reviewing all of those programs to make sure that we are perfectly in alignment and meeting all the nuances of those standards. So that will take some work.

I think the other part of the work will be just what I would call LCH management. So it's a very thorough document, a very comprehensive document. What we like about it from an EHS perspective is it's very clear. It's not dependent on conversations and emails and understandings that aren't always thoroughly understood. So for our organization, once we received the draft, it was

reviewed by all the senior management. So they became very familiar through one document about what all the requirements are.

THE PRESIDENT: Thank you.

Monsieur Harvey?

MEMBRE HARVEY : Merci, Monsieur le Président.

The first question is about the financial guarantee. Reading the document, we see that the financial guarantee is a medium-risk guarantee. So my question is to the staff. Is this something that we are looking for, that medium guarantee, and how do we compare that type of guarantee to other licensees' guarantee?

MR. RINKER: Mike Rinker for the record.

Could I get clarification? Are we talking about the use of a surety bond or just in general the type of facility and the amount that would be associated?

MEMBER HARVEY: Well, not the amount, I mean the type of guarantee. Is it -- when we compare the guarantee proposed by Nordion to other licensees, how do we compare it? And is it for the Commission the type of guarantee that we are looking for, the level of guarantee?

MR. RINKER: So I would say this is the first instance where a financial guarantee is -- well, it has been proposed but not followed through in the past, the

use of a combined letter of credit and a surety bond. I think this is the first time where the instruments are drafted, and should the Commission agree and approve the financial guarantee and its instruments, they would be implemented as a combination letter of credit and surety bond.

So it's the first time, so I wouldn't compare to others, but I think they have been looked at and studied word for word, you know, over a considerable amount of time to make sure that the risk associated with these two instruments would be satisfactory.

And that's what the CNSC staff are recommending, that these are satisfactory instruments from our perspective for the assurance that that facility would be maintained should Nordion not exist and a third party need to enter and look after decommissioning.

To place the facility in a safe state is on the order of \$12 or \$13 million and there is a letter of credit being proposed that would be on the order of \$25 million. So there is a very sound, accepted vehicle that would be more than enough to put it in a safe state. As well, the wording of the surety bond, from our perspective, is a relatively secure facility for those other costs such as licences and rent of the facility while it is being decommissioned and so on.

MR. NEWLAND: Dave Newland for the record.

I would just also add that we have undertaken a fairly substantial legal review of the choice of instrument and the conclusion from that was that it was relatively low risk.

THE PRESIDENT: So can I follow up and maybe Nordion can disclose some secrets to us here.

If this is such a good instrument, why is nobody doing it? Why aren't the big licensees and everybody -- I'm trying to understand. I assume it's cheaper to do it this way rather than a line of credit. Clue me in. What is the advantage here? Is it purely monetary or are there other things we don't understand?

MR. McINTOSH: It's Scott McIntosh for the record.

The primary -- I don't know, I can't speak to why others don't use it, frankly, but I do know that it allows us to utilize cash. So we of course as a business have cash that we use to operate our business on a daily and weekly and monthly basis. If \$45 million of that has to be locked in a line of credit, that's \$45 million that is unavailable to us to run that business and instead we can have a smaller amount locked in cash and pay effectively an insurance premium, if you will, so that somebody else puts up the cash on our behalf. So for our

owners, we now have an ability to invest in capital, invest in new products, invest in new equipment, in hiring and all that kind of stuff that we wouldn't otherwise.

So it may in fact turn out to be a slightly cheaper option than all letter of credit, I'm not sure. That is certainly not the primary driver. The primary driver is availability of cash.

And again, I can't speak to why some of the larger licensees don't pursue this. In some cases the larger licensees are government bodies where perhaps the cash itself is not as big a consideration as it is for a privately held business.

THE PRESIDENT: Okay. Thank you.

Dr. McEwan?

MEMBER MCEWAN: Thank you, Mr. President.

I would like to spend a little bit of time trying to understand the non-conformance related to the transport packaging and it's referenced in the staff CMD, it's referenced in the Nordion CMD, and I think that it was on slide 15, Table C4 -- no, page 95, Table C4 of the Nordion document and page 76, Table 10.

What concerns me is that there was enough non-conformance for an AMP to be applied and if I look at Table 10, which I think is probably an indicator in the Nordion document, there is really no change in the number

of events, reportable events to CNSC related to packaging and transport of nuclear substances, and yet I see that there is a satisfactory for security, transportation and packaging throughout the whole of that period. And yet, we suddenly come in 2014 to a period where there is an AMP required for persistent non-conformance.

So can you explain to me that you are comfortable that this is now not an issue? How did we get to the stage and why was satisfactory applied when there was clearly a problem that led to the AMP? I'm sorry, that was a very long, convoluted question.

MR. RINKER: Mike Rinker. If I could begin, but we do have subject matter experts in both areas.

But I want to make clear that the AMP was not related to transport. The AMP was related to Nordion not reporting to us that what they shipped was verifiably shipped. So it was a reporting requirement.

MEMBER MCEWAN: Forgive me, I would regard that as splitting hairs. I mean it is related to the transport process.

MR. RINKER: So I will take that.

And the second point that I did want to make is one of the improvements, but it was one of the gaps that was realized a year ago, was that the AMP was issued for the export licences, which are separate to the Class 1

licence. And the distinction there is the management system that Nordion has in place was applied to only the Class 1 facility and it was not applied to activities conducted under those separate licences. What that led to was the Corrective Action Program that Nordion has for non-conformances as well as events and so on, including the transport events that we are referring to that are related to the Class 1 facility, were dealt with in a manner that CNSC staff would see documented and we are discussing and monitoring progress, whereas the AMP was issued to -- previously was not being corrected and so there was a separation that no longer exists. Nordion has improved its management system to cover all activities that it does, not partitioned according to licence.

I know that didn't answer directly your question, but if we could refocus what the question is we will pull up the appropriate subject matter expert.

MEMBER MCEWAN: So I think you have partially answered it. So if I understand what you have said correctly, I think you said that there were two separate licences and one licence was fine, one licence was not being complied with.

MR. RINKER: Mike Rinker for the record.

That's correct. Every export has an individual licence issued and each of those licences had

the same licence condition for reporting. It was not the Class 1 licence. It's not the Class 1B licence to authorize the facility operation but there would be an export licence that's issued separately for each export, so many licences, hundreds of licences over a few years.

MEMBER MCEWAN: So that's a little concerning, that there can be a separation of reporting on one activity which is really simply the end process of the Class 1 licence. So where other licensees are exporting, are those gaps still there, and if that gap is inherently there, how do we as the regulator have confidence going forward, particularly if we are looking at a 10-year licence, that that gap isn't going to remain or isn't going to reappear?

MR. RINKER: So if I could call up Tim Hayes from our import/export division. But in general, the reason why there is a separate licence is to ensure Canada's obligations for import and export of nuclear substances of Category 1 and Category 2 material. So these separate licences are required.

Nordion itself has seen this issue and made corrections so that all of their shipments of material are captured under their Corrective Action Program under their Management System, so not parsed by licensee.

And if you want to talk about details about

the corrective actions, I think Mr. Hayes is available to answer those questions.

THE PRESIDENT: Go ahead, please.

MR. HAYES: Timothy Hayes, Acting Senior Advisor, for the record.

Following the issuance of the AMP, Nordion conducted an extensive investigation. This investigation produced several -- actually, numerous corrective actions the CNSC staff reviewed and approved. To date, Nordion has completed all but one of the corrective actions.

This coming Friday Nordion will begin testing an IT solution with CNSC staff. And in Ms Erdman's presentation this was referred to as a capital project. This IT solution will address the non-conformances and will reduce the human error to a near zero state.

MEMBER MCEWAN: Do Nordion have any comments on that? I'm still uncertain as to how that gap can appear, though.

MR. BEEKMANS: Rick Beekmans, for the record.

I guess the first clarification I'd like to understand is you had pointed us to a document or some information in our submission that you are looking at and we want to make sure that we are looking at the same information.

MEMBER MCEWAN: Page 76, Table 10.

MR. BEEKMANS: Okay. Thank you. So I'll start and then I'll ask Jackie Kavanagh if she could contribute.

So first there is a couple of things here. So you can see through the licensing period that there has been an increase in the number of reportable events, and I think this reflects a number of things. It reflects the ongoing conversation and dialogue that we have through the inspections over the licensing period. So through those we change our procedures and upgrade those procedures and make sure that we are reporting all the things that are necessary. It also reflects all the incidents that occur during the time period.

One of the things that will actually happen as a result of the LCH is that some of this reporting will stop because it's reporting what I would call less than significant things. So this would include things as when we receive a package from a carrier and maybe, you know, the labels are peeling off and that kind of thing.

So from there what I will do is ask Jackie Kavanagh if you can answer or contribute, please.

MS KAVANAGH: Jackie Kavanagh, for the record.

And just to speak specifically to the AMP, I

would give you some additional information.

So prior to the AMP we had investigated the non-compliances as they occurred and we implemented corrective action for each of the individual non-compliances. At that time the notifications that we were required to submit for each of the individual export licences were not reported under our QA program for safety. So we were not looking at the general performance of that area.

Since the AMP we have expanded the scope of our QA program for safety to include the notifications for pre-shipment and post-shipment as required by individual export licences. We will be reviewing performance in those areas on an annual basis when we do our annual EHS performance review of our QA program for safety and Environmental Management System.

Following the AMP we immediately implemented increased monitoring and a verification process to ensure that notifications were being tracked and were not being missed. Since we introduced that, we have not had any non-compliances.

At this time, as Mr. Hayes indicated, we are in the process of launching the pilot phase of our electronic solution which will reduce the opportunities for human error by reducing the occasions when employees need

to enter data into the system. So as much as possible, we are automating the process.

So going forward with this improved electronic notification system and the increased monitoring and reporting and performance reviews, we believe that we will be able to maintain our compliance with the reporting requirements for the export licences.

THE PRESIDENT: You know, all this put together in a table -- I don't know if you are listening to many of our hearings -- transportation of nuclear materials is a very sensitive subject in the public. Whether we like it or not, it's reality. So when we see a table like this with 10 events in 2014, there is a sensitivity still involved. So I would have liked to have seen a bit more detail.

Is any of this involving traffic accidents, ever? Do you train your drivers? Are your drivers -- what kind of quality assurances on your drivers are there? It will take one accident with nuclear material to cause really, again, a lot of angst in many, many places.

So in those incidents is there any serious events?

MR. BEEKMANS: Rick Beekmans, for the record.

All of the incidents that we've reported

would be described as a low risk. There are no high risk. There has never been a spill or a loss of containment for the shipments that we have shipped.

THE PRESIDENT: That again, you know, how many shipments a year do you actually do? You know, the volume -- I know that these represent 0.2 percent, but you never gave the actual numbers. Like, what was the -- you know, those are big numbers there, I assume, of shipment if you put in the whole volume.

MR. FULFORD: Greg Fulford, for the record.

The numbers from about 2011 through to 2014 indicate approximately 10,000 shipments per year. Of some of the incidents many of those, about 50 percent, are related to Nordion carriers -- non-Nordion carriers or suppliers where we would be the consignee or the consignor and still report the incident.

THE PRESIDENT: As you should because you still are the responsible authority. But there were no -- if I hear you, there is no -- there was no serious vehicle accident of some sort.

MR. FULFORD: Greg Fulford, for the record.

That's correct.

THE PRESIDENT: Okay, thank you.

Mr. Tolgyesi...?

MEMBRE TOLGYESI : Merci, Monsieur le

Président.

I'm sorry. I want to go back to financial guarantees you are enumerating and the staff, on page 54.

What is included in these guarantees about contingencies, administrative and decommissioning costs, various disposal costs; et cetera? Are there any long term monitoring activities like surface groundwater, soil monitoring required and are they included in the decommissioning costs?

UNIDENTIFIED SPEAKER: I will ask Karine Glenn, the Director of the Waste and Decommissioning Division, to respond to that question.

MS GLENN: Karine Glenn, for the record.

So as part of the preliminary decommissioning plan which is what the activities that the financial guarantees would cover, it would include all the activities to return the site or the facility to a specified end state. And so that would include disposal of the waste, dismantling of the facilities, remediation of the site if required until it met the criteria stated in the end state. So all of that is included in the financial guarantee.

In the case of the Nordion guarantee in this particular case, the approach that they used in calculating assumes what we call decommissioning tomorrow in the event

that there was some kind of need to shut down the facility immediately as opposed to a planned long term decommissioning and that this decommissioning could be done by a third party if CNSC had to step in and decommission the facility.

MEMBER TOLGYESI: So when you're talking about reaching that end state which is established, you are talking in terms of time. What time it could be if it shut down tomorrow? It will be five years, 10 years? What is included in this decommissioning plan?

MS GLENN: Karine Glenn.

For the decommissioning it is not a deferred decommissioning. We are talking about the financial guarantee is sufficient to cover an immediate decommissioning. So there would not be a saved state, storage; typically. So it would be an immediate decommissioning of the facility.

MEMBER TOLGYESI: One more on these financial guarantees.

Are -- Nordion's decommissioning costs cover all radioactive waste on Nordion's side independently on the ownership? Don't you have some others you store temporarily or whatnot? But do you have -- it is included in your financial guarantee?

MR. BEEKMANS: Rick Beekmans, for the

record.

So the short answer to that question is yes. So the plan includes all the funds necessary to dispose of any waste that's on the site.

--- Pause

MEMBER TOLGYESI: You are talking about on page 79 about other regulatory approvals. So there are several short term regulatory approvals which are valid for a year or 15 months or so. For instance, hazardous waste disposal generation, human pathologies, et cetera.

What's involved in a renewal of these approvals, because you do that annually? And what's the potential impact if, for any reason, one of these approvals or licences are not renewed?

MR. BEEKMANS: I will start out. Rick Beekmans, for the record.

So there are a number of permits that we require to manufacture the products that we manufacture.

You asked, what is the impact? The potential impact would -- again, we have never had any challenges with respect to getting the permits necessary to do the business if, for some reason, we were denied a permit that would impact, potentially impact the products that we manufacture. But like I said, all of these permits are necessary. The way we get these permits are based on

the quality systems that we have, our safety systems and our knowledge and capability to manufacture our products.

MR. McINTOSH: I'll pick it up as well.

Scott McIntosh, for the record.

You know, looking through this list that you are referring to, some of these -- some of these permits are for other jurisdictions where we export. That's an example. And it would have the effect, to answer your question directly, of preventing us from shipping to those jurisdictions until we can obtain such a permit.

In other cases they apply to the facility in general and they would have the effect, in all likelihood, of stopping us from processing at that facility.

So it's -- I think I made a reference in my opening remarks to being the most regulated company probably in Canada not just from a nuclear perspective but we also comply with all the -- everything that every industrial business does; environmental, occupational health and safety, labour code, clearly.

We also comply with those regulations that apply to producing drug products and medical products, whether it be Health Canada or the Food and Drug Administration in the United States or European or other jurisdictions. So in each of these cases they have a different impact on our business and some of them are very

broad and some of them are -- simply apply to the jurisdiction that is regulating us at that point.

Does that answer it more clearly?

MEMBER TOLGYESI: Yeah. I understand that because you were talking about 20 years licence that the work to prepare these will be -- it's quite large. So I was looking at these short ones. I believe that there is as much work, as much required to do, maybe even more than for a 10-year licence.

MR. MCGREGOR: Ron McGregor, for the record.

You characterize permits and licences slightly differently. So the Class 1B licence is a licence and there is a great deal of effort that goes into that. Something like the microbiological permit that is referred to here is a permit. We submit information to the appropriate government agency and they show us a permit to do that. The amount of work associated with that is administrative but it's very, very small by comparison.

Our health regulator licences, the majority of our licensing associated with health products goes in the form of a submission and that's a continuous licence. We are evaluated on a periodic basis by the health regulator but essentially it's a continuous licence.

We do also receive -- it's not listed on here -- a Health Canada licence for drug products. That's

renewed on an annual basis. Essentially, it's a form that you fill out and then send into the health regulator.

So, yes, if you look at the defused amount of work that's done for all of these licences there is a fair amount of work that adds up, but by far are the Class IB licence is the lion's share of the work that we do in the facility.

But as Mr. McIntosh mentioned, we are probably the most regulated company certainly in the Ottawa area and we interact with every regulator that we can think of almost.

THE PRESIDENT: Okay. Let's go back to Ms Velshi.

MEMBER VELSHI: Thank you.

A quick comment and question on the financial guarantee and then my real question.

So I was quite taken aback at the level of precision on your revised financial guarantee. You've got it to the last dollar. And is that appropriate? I mean can you -- and it just gives, as I said, a level of certainty which we know does not exist, whereas your previous one was nicely rounded off to a lot of zeros.

So just a comment, and you don't need to rebut. I think you understand where I am coming from.

I have looked at the draft surety bond, and

it's really a question for staff. If you have it in front of you, condition number one, the last sentence says the obligee may require every year a surety certificate as evidence of such renewal. So the CNSC, as being the obligee, it's not "may require"; you do require that, do you not?

--- Pause

MEMBER VELSHI: It's something to look and come back on.

So my question this time around was really to Nordion on your conventional safety performance which has been downgraded from a fully satisfactory to satisfactory in the last year driven, I see, from the submissions by the three lost time injuries you had in 2014.

So notwithstanding that you won an award a couple of years ago, as I look at your conventional safety performance over the last 10 years, as staff probably alluded to earlier, this is not an excellent performance given what we see with other licensees. You have had 16 lost time injuries over 10 years. We routinely hear licensees who worked five million hours without a lost time injury probably with the same level of risks and hazards that you have, if not more so.

So the question was two parts. One is

comparing yourselves to Schedule 1 employers may not be the best peer group you want to. You want to look at kind of the best in class or people who have a similar regulatory regime that has such a high priority on safety.

But, secondly, I know you have got a number of improvement initiatives underway. But I wanted some reassurance that you are not satisfied with this performance, regardless of what last year's performance is, that there is a lot of room for improvement here.

MR. BEEKMANS: Rick Beekmans, for the record, and thank you for the question.

Yes, we take this very, very seriously. So the goal is zero. It's always zero. We do benchmark ourselves with the annual reports that come out and look at the other organizations in our peer groups and compare ourselves to them and constantly strive to be best in class.

In 2013 we had an injury that occurred late in the year and we were focussing on that. It was a low back injury that occurred and there were several more that fall. We were immediately responding. These things are always things that -- a challenge.

I think that, you know, the thing that we need to do is have a safety program. And this is part of the safety culture, is you are constantly competing for the

attention of employees to make sure that they are making the best decisions that meet -- that ensure their safety, ensure the safety of their employees that they work with and, as well, ensure the safety of our facility and the environment. But it is a constant challenge. It's something that you can never rest on your performance.

So in 2013 we won the award and we were very happy about that but we did not stop for a second to continue to focus. We were focussing on near miss during 2013. We continue to focus on near miss.

You know, the thing that you are looking at is -- again, it's the awareness of employees. We had a situation in one of these incidents where an employee was working with a pallet truck and was moving a pallet truck around and pulled on the pallet truck quite hard and had forgotten to lower the legs on the pallet truck and that resulted in an injury.

So our challenge is to make sure that in every step that employees do as part of their day to day work they are always thinking about their safety and the safety of their employees.

THE PRESIDENT: Nevertheless, it's a bit impressive to get this kind of an award. I am curious. Who were you competing with? What is the manufacturing, all manufacturing in Canada? I didn't get a flavour as to

whom or what are the other manufacturers who are being considered here.

MR. BEEKMANS: Rick Beekmans, for the record.

So there were in the order of 180 applicants that submitted their data to be considered for the award. So these were 180 applicants in the manufacturing area across Canada. I don't have a listing of them but that would be information we could supply.

And it was through a process that was -- it was a process that went through several stages that was orchestrated by Reuters. They reviewed all the data. There was a rigorous amount of data that we had to supply. And then they got to a spot where they had a short list and then they conducted a survey of employees at each of those companies and based on the data and the surveys that were conducted, they concluded who would be the winners of the awards.

THE PRESIDENT: So in your application were you also explaining all your safety programs that you do? I'm trying to understand why were you awarded this particular award, which brings me to another kind of a site question is I noticed in a couple of -- you had issue with dosimetry and the accuracy of dosimetry. But I noticed you also do thyroid bioassay.

And I just want to know what kind of tests you do on employees. Is it random tests? Is it only when you actually come across an issue? What is your protocol about testing your employees?

MR. BEEKMANS: Rick Beekmans, for the record.

So I will answer the first part of that question and I will ask Richard Decaire to respond to your question around thyroid monitoring.

So the data that we submitted to win this award was all of the information and procedures that we have data over, I believe it was a five or six year period, so this would be all of our performance data. We also include a description of all of our programs including some of the safety culture surveys that we have run. We also included a number of things that we do to ensure that we get employees awareness. So we have a weekly -- quarterly newsletter that we submit to all employees from the H&S. We ask employees to participate in surveys and submit -- do scrabble and win awards. So we're -- that was all part of the data package that we submitted.

I'll now ask Richard if he could respond to your question around thyroid monitoring.

MR. DECAIRE: Richard Decaire, manager, Radiation Safety and Compliance at Nordion.

Our bioassay program starts with air sampling. So we have a very vast air sampling set of equipment, online monitoring as well as 24-hour air filters, we call it. We just pump air through filters, collect them in a variety of rooms all throughout our nuclear medicine production area looking for the presence of any airborne radioactive materials. And besides naturally occurring radon, we occasionally find radioactive iodine. Because of the nature of those -- radioactive iodines tend to get volatile, so those are things we suspect to find airborne, and that's why we have a bioassay program for thyroid.

The thyroid bioassay program requires different frequencies for attendance, depending on someone's job. Most people attend every two weeks. They're scheduled to attend. Some jobs it's weekly. That's far in excess of requirements that have been put in Health Canada documents in the past decades.

The reason we do that is we want to find something very soon and correct a problem in someone's behaviour at work. Things that we've had happen in the past where we've been able to monitor and measure the technical amounts of iodine in someone's thyroid typically involves the improper use of a respirator. So as I said, that's far in excess the frequency of what's required, but

we do that proactively.

We also recently in the last year have put in a target which is reported on monthly for thyroid bioassay attendance. So the radiation protection manual indicates that we require people to attend monthly, which is also in excess of some of the requirements that have been in Health Canada documents. But we're measuring our own selves internally against our internal targets of weekly and biweekly. And we expect to have -- in the first year of doing this, our target is 90 per cent of compliance to that attendance frequency.

MEMBER MCEWAN: Can I just ask --

THE PRESIDENT: Go ahead.

MEMBER MCEWAN: Just a follow-up to that. So assuming an individual's bioassay comes back positive, what procedures do you have in place for following up on that and acting on it?

MR. DECAIRE: So we have the equipment to measure right within our facility. And we perform a blinded comparison with the human monitoring lab of Health Canada -- which we just did very recently, and on my cellphone today I got back the results. And they're within specifications, which is what we get every year that we've been participating in this program for probably about 20 years.

So we have the facility to early detect the presence of airborne. And in the event that we find airborne -- which we haven't in recent years in areas that would be a surprise to us -- part of our processing involves the possibility of airborne being generated typically when a container -- a waste container or a raw materials container is entered into a hot cell. So in that case, people are required to wear respiratory protection and the entrances to that area are signed as requiring respiratory protection. And then they're only taken down once our safety staff has confirmed that there is no presence of radioactive iodine in the air.

So we're very proactive in looking for the possibility of airborne contamination, which is the most likely route of exposure for people.

MEMBER MCEWAN: So an individual worker is found to have a positive bioassay. What happens to that individual from there on?

MR. DECAIRE: Well, it would depend on the amount that we found on the individual. So the Health Canada guidelines from a long time ago suggested a thousand becquerels to investigate how the occurrence happened in someone's thyroid, and at 10,000, to report. I think there's a more recent CNSC document that contains those same numbers.

So we've typically found over the licensing period, if we detect something, it's below the thousand becquerels. And in that case, we document the results in our thyroid bioassay monitoring program, but we don't record them with the National Dosimetry Registry, because they're very small compared to the effective dose they would receive from external sources.

We've had one instance in the licensing period where there was one individual between 1,000 and 10,000 becquerels. So again, below the amount where we would have to record.

We can also use the services of Health Canada if we want to get independent verification of those numbers. But we are qualified with our own system to accurately produce an amount of activity in someone's thyroid.

THE PRESIDENT: Staff, do you want to comment on this procedure? This is a normal procedure, that you don't report below a thousand becquerels.

And maybe while we got you here, there was some issues with the dosimetry counting against benchmarks in previous years. Maybe you can comment about that.

MS PURVIS: Caroline Purvis, the director of the Radiation Protection Division, for the record.

So as Mr. Decaire alluded to, the CNSC has a

regulatory document RD58 titled "Thyroid Screening for Radioiodines." And the same numerical values recommend ascertainment of dose at 10 kilobecquerels or 10,000 becquerels or greater.

The expectation for licensees is, in the case where an individual has an intake that exceeds that value, they would take whatever measures are necessary to seek a licensed dosimetry service, if one's available, to provide a dose estimate. If that's available, then they would need the approval of the CNSC to use their own equipment or another qualified licensee's equipment to assign the dose.

So everything that was mentioned is consistent. As described in Nordion's CMD as well, there hasn't been an incident in reporting period where an individual has exceeded the 10,000 becquerels.

With respect to your comment about the dosimeters, I assume you're referring to the management of contractor dosimeters. Certainly earlier on in the licence period, there was indications that Nordion was having some difficulty in the management of contractor dosimeters and ensuring that when they're sent back to the licensed dosimetry service that they have a control badge sent with them so that when they do the determination of the dose received by the individual that it subtracts the background

dose that the control badge would measure.

Since that time, Nordion has taken a number of steps, to firstly review all of the contractor doses going back into the late 1990s, documented the processes that are required for the management of contractor dosimeters, and to ensure that contractor dosimeters are always returned with a control badge.

Since 2009, there's been no further incidents, and certainly we're satisfied that contractor doses are well managed and below the regulatory dose limit.

THE PRESIDENT: Thank you.

M. Harvey.

MR. BEEKMANS: Rick Beekmans for the record.

There were just two things I would like to add just a little bit to add some colour to the comments that Richard had provided.

So from a thyroid perspective, what we do is very much risk-based. So you know, we know that when people are dealing with containers, there is the potential of a release; hence we require that people wear the appropriate safety gear. And as Richard described, when people are working with -- in certain areas, there is always -- there is the potential of iodine uptake; hence we are very proactive with our program and monitor on a rigorous basis to ensure that those things don't happen.

And if there is any uptake, we are quickly alerted to it and we can respond to whatever happened.

THE PRESIDENT: Thank you.

M. Harvey.

MEMBER HARVEY: Merci.

MR. RINKER: Excuse me, if I could interrupt, M. Harvey.

Ramzi Jammal, our executive vice-president for operations, would like to make a statement regarding financial guarantee before we move on to another question, if possible.

THE PRESIDENT: Go ahead.

MR. JAMMAL: Thank you, Mr. President. It's Ram Jammal for the record.

And Ms Velshi asked the question on the record with respect to the annual requirements for Nordion to report to us.

I'll refer you to licence condition 1.3. It says: "The licensee shall maintain financial guarantee for decommissioning that is acceptable to the Commission."

And on page 17 of our Licence Conditions Handbook, which clearly states the compliance verification criteria, item number 3 requires the licensee to report to us annually to the CNSC on the status of the financial guarantee to ensure it remains valid, in effect, and

adequate to fund the decommissioning of the facility.

So there is the contractual argument within the instrument itself and the applicant, but the compliance verification criteria requires the licensee to report to us annually with respect to the validation.

And I will go on, Section 12.2, which talks about the decommissioning strategy.

So there is always a holistic approach and review evaluation of the financial guarantee and decommissioning strategy.

MEMBER VELSHI: Thank you.

So the question really was that does the surety have to issue a certificate to the CNSC or is reinsurance from the licensee adequate that it's been renewed.

MR. JAMMAL: It's Ram Jammal for the record.

It's the licensee's responsibility to report to us, and we'll validate that everything still is adequate.

MEMBER VELSHI: Thank you.

THE PRESIDENT: M. Harvey.

MEMBER HARVEY: Merci.

In Nordion's presentation, they mentioned that they have obtained the ISO 14001 environmental management. So my question is to the staff: What does it

mean for you? Is this to say that once you've got that, you meet all the CNSC's requirements and/or obligations? And does that have an incidence on the way you are managing the licence -- the enforcement, monitoring, et cetera. In fact, what does it mean for us, that?

MR. RINKER: Mike Rinker for the record.

I'll take a crack at this, and if you have more questions, we'll discuss with our specialist.

But in general, we have regulatory requirements for environmental management systems to be in place. That may rely on being registered with ISO 14001, but that does not necessarily mean that they meet our requirements. We expect a program to be in place for the CNSC. And the fact that it's also certified ISO 14001 and there's an external audit function -- there's audit reports that are available that inspectors may review on inspection, and we can follow up on corrective actions that an independent auditor may be making -- is helpful. But it's not necessarily the fact that it, you know, with or without certification meets our expectations. Our expectations are documented in our regulatory documents.

THE PRESIDENT: Is there somebody who wants to give some comments here?

MR. BEEKMANS: Rick Beekmans for the record.

So I would mirror everything that Mike had

shared. It's another set of eyes that looks at our environmental program. There are standards that we have to meet. We meet those standards. We have of course the CNSC audits that come and look at our programs. One of the benefits of having ISO 14001 certification is it helps us to ensure that we're staying ahead of CNSC requirements. It's another set of eyes looking at our same procedures and programs that the CNSC looks at which we want to ensure is always meeting the requirements and exceeding the requirements in the area of environmental health and safety.

MEMBER HARVEY: How often do you have independent review, and what do you do to maintain this certification?

MR. BEEKMANS: So independent review is done on an annual basis. So there are requirements within the standard that you need to meet. They come through and do a thorough audit. Typically there will be two people for three to five days going through all of our procedures. And inevitably through that process continuous improvements are identified. And then we will implement those to continuously grow our program.

The 14001 standard is in the midst of being revised, so we will continue to ensure that our programs meet those requirements as the standard changes.

MEMBER HARVEY: (Off microphone) find that in something you don't meet the requirements, so they can go to the staff and verify, and then it would be part of some recommendation and some action following that?

MR. BEEKMANS: Rick Beekmans for the record. Sorry, I'm not understanding --

MEMBER HARVEY: Well, I'm saying suppose those independent reviews, they find something and you are not in -- compliance with certain specific items -- specific requirements from the CNSC. You will have to do something; otherwise you won't maintain that certification, I suppose.

MR. BEEKMANS: That's correct. So maintaining the certification is very important to us. I guess the other thing I would also mention is it's important to some of our customers and our suppliers. So we will have customers and suppliers look at this program when they come in and audit us and will ask us questions about our 14001 certification.

MEMBER HARVEY: But the essence of my question -- I wanted to be certain that having that -- that means something, even for us. So it's not only a trophy. It's something that you have to do something to maintain.

MS MAHONEY: Jennifer Mahoney for the record.

Yes. So if something were to be identified in either a maintenance or a recertification audit, to answer your question, it would result in a finding which would require us to disposition that finding in some manner which would likely be a corrective action that would make us -- force us to take some action on that.

MEMBER HARVEY: To the staff, have you ever received any questions from such audits for Nordion or their licensing?

MR. ZHANG: For the record, my name is Henry Zhang, environmental program officer.

Yes, since staff review and assess the findings from internal and third-party external audit from Nordion so to make sure any correction is needed and to make sure that any finding is being addressed, we provide CNSC staff's recommendations and suggestions to make sure the environmental program is adequate and implementation is performed.

THE PRESIDENT: Thank you.

Dr. McEwan.

MEMBER MCEWAN: Thank you. Thank you, Mr. President.

One of the frustrating things I found in reading both documents was, I mean, this is clearly two quite separate businesses. You've got Medical Isotopes and

the sterilization products. And presumably those businesses have different risks associated with them -- risks of contamination, risks to staff, et cetera. And there is no way of discriminating whether one of those businesses is performing spectacularly and one of them is performing marginally, because the data are all just presented as Nordion data.

And if I go to page 44 of the Nordion CMD and Tables 5 and 6. So although I think for the contamination incidents by radionuclide it may be intuitive which of the businesses those contaminations have come from, it's not overt. And certainly if you look at the contamination incidents by contamination level, you have no way of knowing which of these two businesses has actually contributed to that.

And I'd also note that for the high levels - - the greater than 10,000 and greater than 50,000 -- again, if I look over the licence period, there's really been no change in performance in those contamination levels.

So I guess I'd like some assurance that when we see summed data like this it actually reflects adequate performance by both businesses.

And it would have been really helpful to have just a little bit of ability to discriminate as we were reading these.

MR. BEEKMANS: Rick Beekmans for the record.

So I guess, at a high level, the first way I'll respond is that, you know, there is one licence. We have one quality assurance for safety and one program across the organization. We have one EHS safety committee, which is a combination of management from across the organization. So there's one system in place.

I guess with respect to the details here, we did not -- so in some places, as you've pointed out, it's kind of intuitive. Cobalt-60 would be on the Gamma side. With respect to contamination, we haven't given that breakdown, but we could. And if that would be helpful, that would be something that we can do in the future.

MEMBER MCEWAN: So where you have one system across -- I mean, that was my other concern reading your document. There is a plethora of committees that you mention and committees reporting to committees. It would have been very, very helpful to have had some sort of flow sheet or linear sheet on understanding truly what the relationship was.

But I would have expected that from the staff's point of view it would be important to know if the Medical Isotope unit was performing badly and that the cobalt-60 was performing really well, because that implies that there is something happening internally that is not

leading to the best outcome.

MS PURVIS: Caroline Purvis for the record.

So I would agree with you, Dr. McEwan, that the information on page 44 is difficult to interpret in the context of safety. From staff's point of view, we would need much more information to make it meaningful to the public.

That being said, obviously Nordion trends the information. They are looking to see that contamination is controlled at the source and that it's not leaving the facility. And when you look at the radiation incident reports and the ALARA reports that have been reported to the CNSC, there's no indication that that indeed is happening, that contamination is leaving the facility. So from that point of view, we're satisfied.

We do on our routine inspections. Both the baseline and RP-focused inspections look at contamination control. And obviously the potential for contamination in certain activities is greater. The cobalt operations, for one, you know, could be a higher potential area.

We're satisfied that Nordion is taking measures to control contamination, to upgrade their instrumentation, to detect contaminated personnel prior to leaving the active area. So from that point of view, staff is satisfied.

MEMBER MCEWAN: So just following on from that, we're comfortable with the fact that there is no meaningful change in the high-level contamination over the licence period?

MS PURVIS: As I said, the information here -- it's difficult to determine exactly what is meaningful in here. From what I can see, the trend is -- certainly has trended down since 2008 and it has remained stable. The consequences of these higher-level events -- I can't tell you what they are at the current time.

MR. BEEKMANS: Rick Beekmans for the record. So the monitoring of contamination vents is one of the critical things we do from an EHS safety committee perspective. So we are constantly looking at this data that you have in front of you to see if there are any trends or shifts that we need to look into.

So from our perspective, in fact, again, these numbers are very, very low and that there haven't been any significant trends or shifts tell us that things are working the way we would expect them to.

I'm going to ask Richard to comment a bit on the contamination events and just maybe give you a bit of colour as to how that program works, monitoring of contamination.

MR. DECAIRE: It's Richard Decaire, Nordion.

I'll start out with an anecdote, if that's okay.

When I started at Nordion 19 years ago the senior health physicist told me that if you're working with unsealed radionuclides, which Nordion does, you're going to have contamination incidents; if you don't have contamination incidents, you're not working with unsealed radionuclides.

There is an issue any time anyone works with unsealed radionuclides is that you have to check for contamination frequently, an operator has to do that by hand. There's a corollary to looking for -- sweeping for mines in a field. There is a success rate that people have who do that and a failure rate also. The failure rate is every so many acres they will miss a mine, which is critically important to their personal safety and then what's left behind for other people.

So it's known from performance factors that personnel checking by hand for something can miss contamination. So we have the philosophy the nuclear industry uses, defence in depth. There's very many checks along the way to ensure that contamination does not leave our production area, it does not harm our individuals and it is done by risk -- as we were talking earlier about the bioassay for thyroid, there is a difference between the gamma side and the medical isotope side.

On the gamma side you're working with metals, cobalt's a metal, and the other impurities with it, they're not volatile. So we have air sampling there as well, but you're less likely to get something in the breathing air of people, grinding of sources inside a hot cell which has its own ventilation, et cetera, that looks very different than processing radio iodines.

So that's one thing. So obviously, you know, from the table of incidents the cobalt 60 ones are all from cobalt 60. There's other impurities associated with the cobalt 60 process, they're typically zirconium 95, niobium 95. There's other things we look for that are trace impurities that we don't find in contamination in our facility.

The other incidents, they are what they are. They're like people checking for land mines, they will miss things. So we have very many steps to check for things to ensure safety.

One of the other areas we could break out that, it's in our annual reports I think for the last three years, is in dose. So it was mentioned in our presentations from both sides the efforts that have gone in to lowering dose to the cobalt staff. All the people in the last 10 years who have the highest dose on the charts, they're all cobalt shippers.

So our focus has always been in that area, and in the last three years I think we've listed the top 20 dosed people and it's listed by area, whether they're on the gamma side working with cobalt 60 or on the nuclear medicine side, and from that I think if the annual report information was included you'd get a very quick sense of where the dosimetry lies.

So it's easy for us to do if the Commission would like us to split out that information and give more clarity around that, but as Rick said, we have one safety system, we have the same safety staff and procedures looking over any process in our facility. So cobalt is very large, it has the highest activities by several orders of magnitude, so it's a very different animal, it's very different risks involved.

And then our performance, like I said, we can split it out however you would like.

THE PRESIDENT: Okay, thank you.

Mr. Tolgyesi...?

MEMBER TOLGYESI: Merci M. President.

I should just agree with Dr. McEwan that I was a little confused with all these committees and who's reporting to who and what relation with.

And you're talking about Nordion's environmental health and safety committee. That's

management committee, I suppose?

MR. BEEKMANS: Rick Beekmans for the record.

That's correct. I'm the person that chairs that committee and that's the committee that has responsibility for oversight across the Kanata site to ensure that we are in compliance with the requirements.

MEMBER TOLGYESI: To what extent are employees involved in these committees, or do you have a lot type of committees which are joined like health and safety, probably you have that. Do you have other type of committees on other subjects where the employees are participating?

MR. BEEKMANS: Rick Beekmans for the record.

Yes, there are other committees. So we have a policy committee which is a joint management and employee committee that looks at critical safety policies and any changes that may happen to those policies and we get input from those employees.

We also have a health and safety committee which is a joint committee that involves employees in management, they do -- they meet on a regular basis, do reviews of the facility and our procedures and report back on results and the results of those committees are input to our EHS management committee.

MEMBER TOLGYESI: On page 17 you are talking

about relevance in management. So how many of total employees are classified as nuclear energy workers?

MR. DECAIRE: The numbers are -- someone help me there -- in the dosimetry area I think in the documents. There's number of people monitored per year is one of the tables. I think the CNSC prepared it as well. I know we had to vet that.

MEMBER TOLGYESI: But the number of people monitored, it could be that somebody's monitored three, four times, so it doesn't mean that how many persons are classified as --

MR. DECAIRE: No, all the people monitored in that table is Nordion staff who are considered nuclear energy workers, every one of them.

We also monitor contractors, but they're monitored on a separate account and that does not include those people. We do the dosimetry in the -- that we tabulate on the annual reports separately for contractors who are not nuclear energy workers and our employees who are all considered nuclear energy workers. So it's the same number.

The totals for dosimetry for all those years, they're all nuclear energy workers.

MEMBER TOLGYESI: So when you are talking about your convention health and safety performances,

contractors are included in those figures or in those performances, or they are not; and if they are not, what's their performance on your side?

MR. BEEKMANS: Rick Beekmans for the record. So from a health and safety perspective, if there were any incidents involving contractors they would be reported in the data that we've included here.

MEMBER TOLGYESI: That's included in your stats?

MR. BEEKMANS: That's correct.

MEMBER TOLGYESI: Okay. And I'm going back to page 17. You are talking about written tests. What happens if an employee missed the written test; is there a period to re-write the exam, or how many times and what's your success rate?

MR. DECAIRE: Richard Decaire, Nordion.

I'll just start with where the information is provided for the number of nuclear energy workers. It's in Addendum B on page 91, Table B-1 has the total number of persons monitored for active and non-active areas in the second column year over year for the licensing period.

Thank you, Corby. And in two pages after that, Table B-3, has all the contractor numbers for the same timeframe.

There was a question about -- while I was

looking for this, about testing.

MEMBER TOLGYESI: Yes, because you are talking about written tests.

MR. DECAIRE: Okay.

MEMBER TOLGYESI: Okay. And the employees should pass it to be qualified and to prefer more work. My question is, what happens if he miss the test?

MR. DECAIRE: Well, as you know, we've implementing the systematic approach to training in the last couple of years, so the amount of recorded testing is increasing, but over the licensing period the main test that we had was the nuclear energy worker test and in the contract for employees, we consulted a lawyer before the licensing period about what was an appropriate number of times an employee could write the same test, we have multiple versions of it, but if someone keeps failing at the same test, when is that acceptable or not?

So in everyone's contract for nuclear energy worker since before this licensing period started it's understood that a condition of employment is after they take the training, they only have two opportunities to write this test. If they do not pass the second opportunity, then they no longer are employed, that's Nordion's condition of employment.

Subsequent to that there is re-testing every

three years and we haven't had people fail that test.

THE CHAIRPERSON: Ms Velshi...?

MEMBER VELSHI: Thank you.

On page 47 of CMD 15-H7, the Nordion CMD, you talk about challenges with the disposal of neutron sources.

Can you tell us a bit more about how much and over what period of time and then maybe staff can tell us how other licensees have handled this issue.

MR. DECAIRE: Richard Decaire, Nordion.

We have three neutron sources which have been on site at Nordion since -- longer than the 19 years I have been there. They have mostly been used as storage. We would like to dispose of them. Chalk River would not accept them.

So we have asked Staff recently for guidance in what to do. And we have been directed by CNSC Staff to discuss with other industries in Canada that use neutron sources, particularly in the oil and gas sector, and we have had some assistance there. We haven't made contact with them yet, this is all fairly recently, but we would be delighted to dispose of these sources. We have not actual use for them.

MEMBER VELSHI: Staff?

THE PRESIDENT: While you are pondering

this, I really would like a little bit more comprehensive answer to the question, what will Nordion do with all of its eventual low and intermediate and high-level, if any, waste. Where is it going to go?

MR. RINKER: Mike Rinker, for the record.

So the simply high-level answer is it must go to a licensed waste facility. Right now, the main licensed facility would be at Chalk River. However, over the next several years things could change, there could be repositories over the next five, 10 years that would be open. So it is not necessarily a single destination. Cost estimates in the financial guarantee are based on disposal at Chalk River.

THE PRESIDENT: But in the meantime, I know that they have now classified their waste in different categories or boxes they call them or whatever. So right now they have to store it on site. Is it the idea, all the waste has to be stored on site until they find a place to ship it to?

MR. BEEKMANS: Rick Beekmans, for the record.

So the issue around trying to determine a place to dispose of material is specific to these neutron sources. For the majority of our waste material, all of our waste material minus these three sources, we have

contracts in place with various waste providers. Chalk River we have talked about for the disposal of any waste coming from our facility.

THE PRESIDENT: So, for example, cobalt, is there any waste associated without -- aside from the neutrons, is there any other waste that require you to go to a licensed facility?

MR. BEEKMANS: So there is waste -- Rick Beekmans, for the record -- cobalt waste, and waste from each of our processes that is required -- that needs to be disposed of and it is disposed of at licensed facilities here in Canada and in the U.S. on an ongoing basis.

THE PRESIDENT: So why did Chalk River not want to accept the neutrons? Somebody clue me in on this.

MR. BEEKMANS: I don't have an answer for that question.

MR. McINTOSH: And again it is Scott McIntosh, for the record.

I will stress it is just these three neutron sources that are the issue that you are describing; a very small, very important of course, but very small portion of the waste that you are probably imaging.

Nordion disposes of the waste from each of our processes as it occurred. Of course, there is a retention time after a process, but it then goes to a

licensed facility such as Chalk River, I will call it on a routine basis, and we have contracts in place to manage that with the exception of these neutron sources.

THE PRESIDENT: I am trying to figure out, why is there an exception here? What is so special about - what is so difficult about those, anybody know?

MR. RINKER: Mike Rinker, for the record.

The answer is we were surprised. We don't know why Chalk River has said they are not willing to accept these. So we have been working with Nordion, this is quite recently, and looking for other industries that do use these sources and what they do. But we are trying to solve this problem at this time.

THE PRESIDENT: Ms Velshi?

MEMBER VELSHI: So across the country, how big a problem are neutron sources and why does Nordion have them in the first place?

MR. BEEKMANS: Rick Beekmans, for the record.

As Richard described, these are what I would describe as historical sources. They have been on the site for many years. So specifically why they were acquired many years ago, I am not in a position to answer that question.

At this point, our focus is working together

to understand the means of disposal, contact people, as Richard described, that do use these sources, it sounds like they are used in the oil industry, and understand how they manage with them. That is the best answer we have for that right now.

MEMBER VELSHI: Thank you. I think it is something that once you have found a path forward, I would be interested in hearing how it is going to be handled. Thank you.

THE PRESIDENT: Thank you.

Monsieur Harvey?

MEMBER HARVEY: Merci. On page 41 of your - - this morning's presentation, it is about the conventional health and safety. Among the improvements you mentioned that 90-second stretch video to be used at the start and the end of the shifts. Could you explain that?

I found it very interesting, but a few minutes after I say, well, the people -- knowing the people, they will say, well, I don't have to watch the video because I already watched it 10 or 20 times.

So is it a significant instrument for safety?

MR. BEEKMANS: Rick Beekmans, for the record.

These videos, the intent of these videos,

are training videos and the purpose of them is to train employees in techniques, and it is very important.

So much of the work in certain areas can be very repetitive; the technicians work with master-slave manipulators in front of cells, in the cobalt area there are thousands and thousands of manipulations that are performed to manufacture the sources on a daily basis.

So it is important for the people doing this work, that they take the appropriate timeouts, and that is built into our process as we rotate people through these cells; they peel each other off, they take a break, they go to some other work. And all of this is with the purpose of preventing injury, either repetitive strain injury, low back injury, neck injury, any kind of physical injury.

MEMBER HARVEY: And you mentioned to be used. But is it really used? I mean, is it mandatory, that they have to look at the video -- to watch the video everyday, every...?

MR. BEEKMANS: Rick Beekmans, for the record.

So some is mandatory and some is part of the employees working together with their managers. So a lot of the training that we provide, we have training procedures on manual handling of material. That is a mandatory requirement for all employees. On a regular

basis, they are expected to go through that manual to make sure they understand the techniques to safely move materials around.

When technicians are trained to work on our production facilities with the master-slave manipulators, part of that in training includes them being taught how to use them appropriately to prevent injury.

The videos that we produce, again, those are all part of training. So our expectation is that employees will review them, managers will ensure that they review them, and it is a tool that we are providing as the AHS Group to provide to managers to help them make sure that employees have this at the top of their awareness when they are doing their jobs.

MEMBER HARVEY: Question to the Staff. Is it something very specific to Nordion or there is the equivalent in other facilities?

MR. RINKER: Mike Rinker, for the record.

No, I haven't done a survey, but it seems like an innovative way to help workers. So, you know, other than the recent concerns we had with back injuries, we have been quite satisfied, fully satisfied, with Nordion's ability to protect its workers, and this is one innovative solution.

MEMBER HARVEY: Okay.

MR. BEEKMANS: Rick Beekmans, just to clarify.

I mean, the sole purpose of these videos is training. So my expectation is employees that are working in certain areas may watch them once or twice so that they can learn the techniques. But after that point, they may use them on an annual basis just to remind themselves of those techniques.

MEMBER HARVEY: Well, was not that. Okay.

THE PRESIDENT: Thank you.

Dr. McEwan?

MEMBER MCEWAN: Thank you, Mr. President.

If I could go to slide 35, Nordion, please? I am not sure if this is a question of use of English or a question of understanding. But are Staff happy to have the DRL described as an allowable CNSC limit in that box?

To me, it looks as if we really don't care if it goes all the way up to the DRL, and I think it is a gross misrepresentation of what we expect.

MS FRANCIS: Kiza Francis, for the record.

I guess what I would say is we would not want it to go up to the DRL. It is in fact the licence limit, however there are action levels and limits much lower than that. So we would probably not use the terminology "allowable limit." However, we do use the

terminology "licensed limit."

MEMBER MCEWAN: Which is why I said it might be a case of use of English. But I think that licensed limit is a very different concept to allowable limit.

And I am also concerned that there is no action level line on this graph as well. And I really think it is very unfortunate that it went in as it did.

I don't know if Nordion would like to comment?

MR. BEEKMANS: Rick Beekmans, for the record.

So I guess the sole purpose of this slide was just to illustrate the data. I would agree that it was an unfortunate choice of words that we missed.

The DRL is, you know, the documented value between us and the CNSC and, based on that value, action limits and alert limits are set and agreed to internally. And between us and the CNSC, our goal is to continually monitor and ensure that our releases are as low as can be reasonably achievable.

THE PRESIDENT: Just a comment again while I see those graphs and you use a couple of times -- I really would have appreciated the actual value of the DRL. You know, in many of those places you talk about DRL without the actual value what it is.

Some of us come into DRL for different facilities, for different substance, et cetera, it would be nice for you to actually also give the value as well as the percentage and the action level.

Dr. McEwan?

MR. BEEKMANS: Rick Beekmans, for the record.

Thank you for the feedback. One of our challenges is to -- so we had a logarithmic scale, people that look at that might say, oh my goodness, you know, you are half of the limit. So we chose to put the other chart there just to try to gain some perspective. So that would be something we can consider for upcoming presentations.

MEMBER MCEWAN: So if we stay on the same slide, if we look at the logarithmic scale, you have a bump between 2011 and 2014. So I have no idea where that is in relation to real values or to your action level.

What caused it? Was it significant? What did you do about it?

MR. BEEKMANS: Rick Beekmans, for the record.

I will start the discussion, and there may be others here that can contribute. But instead of describing the bump, maybe I will describe the valley in front of the bump. And the valley in the years of 2009 and

2010 were the years where we had issues with supply. So there was a significant decrease in production and, hence, any associated releases that occurred during that period.

So, you know, if one were to imagine that during that 2009/2010 period production continued without the disruption, you would see more of a straight declining line, but that is speculation of course on my part.

THE PRESIDENT: Since we are looking at graphs, this is an observation that some keen eyes caught, so I'm going to share it with you. So there is discrepancy between -- if you look at slide for Staff, slide 12 on presentation and on Nordion's slide 26. The averages, numbers, for the same graphs are completely different.

Can anybody explain? It is supposedly showing the same thing. What are we missing here?

MS PURVIS: Caroline Purvis, for the record.

The graphs don't show the same thing. The maximum individual doses are the same, as you have gathered from the two graphs. In the Staff's CMD we have included all nuclear energy worker dose results, so that includes those categorized as active-area NEWS, as described earlier by Mr. Decaire, as well as those workers that are categorized by Nordion as non-active- area NEWS.

So those are persons that work traditionally outside of the active area, but do enter from time to time

and are subject to occupational exposure.

So our results include more workers, includes all NEWS, all that are monitored at Nordion. Whereas Nordion's graph and, although the title is perhaps slightly misleading in the slide, it is correct in their CMD, and they specify it is only active-area NEWS that they are including.

THE PRESIDENT: Okay. Just you can appreciate that one was hoping to compare apples to apples.

Okay. Monsieur Tolgyesi.

MEMBER TOLGYESI: Merci, monsieur le Président.

As we are talking about graphics, if you go to Nordion's page 69 there is a figure 9 which is saying "waste diverted to landfill for 2005-2014." And just about, just about the text is saying that the radioactive waste shipments and the percentage of waste diverted is shown in figure 9.

There is a few different things there. I mean, it is not the same thing, what it is supposed to be. It is just a comment probably. There is something missing, but it is two different things.

On your --

MR. BEEKMANS: Rick Beekmans, for the record here.

So we are just trying to digest that information. We don't have a response right at this moment, but it is something we will have to double check.

MEMBER TOLGYESI: Yes. This was really a comment, you know, where we were talking about graphics.

MR. BEEKMANS: Thank you.

MEMBER TOLGYESI: When you are talking about public information program, you are enumerating what is -- to outreach what you use. And you are saying also social media, like Facebook, Twitter, LinkedIn, is each used to communicate with stakeholders.

Is it communication where you give information, you give out, or it is also where the public could come back, ask questions, and you answer?

MR. BEEKMANS: So I will start that, and I might ask Shelley Maclean if she could also pitch in.

So primarily, that is a way for us to share information and put it out. And it gives people viewing that information the opportunity to further share it.

Shelley, can you add something to that please?

MS MACLEAN: Shelley Maclean, for the record.

We do use social media on a very regular basis to both conduct messaging being pushed out by

Nordion, but we also regularly, which is actually daily, review social media to ensure that nobody is pushing information to us or questions.

MEMBER TOLGYESI: Can you be a little bit more specific? So if the public is interested in things, how they could communicate with you? Besides I think you have some meetings with -- and public meetings, but social media is quite strong these days.

So have you managed this part of communication? Because this is a part which is, I think, preferred way for the public, mainly those under 50. I am sorry, I am not in this group. But have you used this social media to interact with the public?

MS MACLEAN: Shelley Maclean, for the record.

So you are correct, it is being utilized quite extensively. We haven't taken notice in a huge adoption, to be honest with you, externally, as far as people asking us questions through this means.

As indicated, we do monitor all of our social networks on a daily basis. We check our Facebook page regularly as well as LinkedIn and Twitter. But we are using it as a means to push the information out.

We do of course have our website, and people do ask questions through our website on a fairly regular

basis, but it is not related to environmental health and safety questions. They are often related to job ads or business requests that are coming in.

And again, we do monitor that on a daily basis. We do have a standard where we look to respond to these questions within a 24 and 48-hour period. And we do, when they are related to environmental health and safety questions, we do have a process in which we do record these questions to ensure that they are actioned and closed.

THE PRESIDENT: We need to move on.

So Ms Velshi, I would like to do one more round because we have written material.

MEMBER VELSHI: Quick question. When you had your fire earlier this month, was there a lot of public concern or did you get a lot of queries from members of the public?

MR. BURNETT: Tom Burnett, the President of Medical Isotopes.

I was on site when the fire happened and handled a lot of the media inquiries that came in. It was very evident that social media was alive and active during the fire. Inquiries came in very quickly and media was on site very quickly.

We pushed out messages through our website and through social media throughout the day. Several

updates as we progressed through the day.

In terms of inquiries from the general public, again, there were interested parties who were near the site, looking on. But in terms of inbound inquiries, mainly from media and then I think a lot of people were getting their messaging from media in terms of updates as to what was happening.

MS MACLEAN: Sorry, I'm just going to chime in here, Shelley Maclean, for the record.

We have had one inquiry from a member of the public since the fire. It was actually an inquiry from an older woman who was having roof work done. And she was inquiring as to who we had hired to do our roof work to ensure she didn't hire them herself.

Thank you.

--- Laughter / Rires

MEMBER HARVEY: Last short question.

It is about public information programs. On page 53 of your presentation you mentioned of those of the community who are aware of Nordion, the majority rate that the facility as being safe.

But you have the figures, what was the percentage of people aware of Nordion among all the people you have contact...?

MR. BEEKMANS: We don't have that data right

at our fingertips, so I am not in a position to give you the exact response or the exact number.

THE PRESIDENT: I thought they were available in your appendix, but maybe not. Okay.

Dr. McEwan?

MEMBER MCEWAN: Thank you, Mr. President.

So the Staff presentation, slide 9, the compliance inspections and the enforcement actions. There were 11 still open and you say none of those will impact relicensing. So what would be examples of those? And of the 38 that are now closed, could any of those, if they had not been closed, have impacted licensing?

MR. RINKER: Mike Rinker for the record. I will ask Ann Erdman to respond to that question. She was the inspector that led the majority of these inspections.

MEMBER MCEWAN: Thank you.

MS ERDMAN: Ann Erdman.

In terms of the inspections, there were three inspections performed. The main items of the 11 are in -- we did a management system inspection in January and they were mainly documentation issues. Nordion had a program in place for management systems but it was to improve their documentation, to improve some of their documenting, what they actually did. They would tell us what they did but it's not what was written down in the

paper that we had. So that was a finding that we had.

They also -- we wanted some increased participation of some persons in some of their programs, like the self-assessment program, and they already had participation but we just looked at who was participating and made a suggestion to include additional people.

Then the second inspection we did was in the end of January, shortly after that inspection, and it was regarding fire protection. Just to follow up, what I should say at this point is that in the recent phone call we had with Nordion just this week, early -- it was late last week, we actually went over the various items that were outstanding. We haven't closed them officially on the book. Nordion has not responded in writing to what they did but we have asked them what they have done regarding each of the items and they have told us what initiatives they have taken and many of the -- some of them, Nordion has considered action taken and I believe they have said closed. But we still have to follow up. We have yet to get a response from them in writing. They have given us a date to get that information in to us and that date is acceptable for us.

Only one of the items is still outstanding from prior to 2015 of those 11 and that item again is similar to the last one where we as staff have to go onsite

and actually finish the review of the information. Nordion submitted the information to us regarding -- I believe it was -- I can't recall right at this point but I'm sure I have it. But it's the same thing as the previous one. We need to go onsite. We have considered it closed on the books, on paperwork, but we need to go in person to verify that it has actually been done.

THE PRESIDENT: A lot of it sounds like an administrative kind of issue. Are any of them a safety concern, any of the --

MS ERDMAN: Ann Erdman.

No. I would say these are mainly administrative at this point in time.

THE PRESIDENT: Thank you.

Monsieur Tolgyesi? Anybody, any other urgent kind of a question?

I have just one. This is safeguard the non-proliferation. How many times has IAEA visited the site? I'm always asked that question. Does anybody know?

MR. RINKER: Mike Rinker, for the record.

I will get confirmation from the Director of our Safeguards group. Generally, it's once per year, including September 2015 they plan to come.

THE PRESIDENT: So it's generally once a year?

MS KAVANAGH: Jackie Kavanagh for the record.

Nordion is part of a group of licensees, I think there are about eight licensees within that grouping and the IAEA selects one randomly to actually physically visit once a year. So annually we do a physical inventory-taking ourselves. The CNSC Safeguards Group will arrive onsite to verify and do their own inventory review but it has been -- I believe, and we would need to confirm this -- the IAEA has probably not been on our site since 2008.

THE PRESIDENT: Well, we have CNSC staff. Go ahead.

MS OWEN-WHITRED: For the record, Karen Owen-Whitred, the Director of the International Safeguards Division.

What you have heard already is exactly correct. Nordion is required to perform a physical inventory-taking once per year. That is then subject to IAEA verification on a randomized basis. The IAEA actually has not been to Nordion for an inspection since 2006.

THE PRESIDENT: And I understood that Nordion volunteered to go online in your new NMAR e-business system. How is that going, staff, since it's your system?

MS OWEN-WHITRED: I can say that it's going

well, certainly from the perspective of those who have adopted the system already. It is aimed at increasing the efficiency of the required reports that are submitted by licensees to the CNSC for safeguard purposes and we are certainly appreciative of those licensees who have embraced early adoption of this type of reporting.

THE PRESIDENT: Nordion, do you find it helpful, easier, less burdensome?

MS KAVANAGH: Jackie Kavanagh for the record.

I think it's streamlined the process for us. It's very simple to make the reports and Nordion did volunteer to participate in the testing of that program with the CNSC.

THE PRESIDENT: Okay. Thank you. I think this completes the question period.

Marc, do you want to take us through --

MR. LEBLANC: Yes. What I will do, Mr. President, is I will go through the list of written submissions we have received and for each of them I will ask the Members if they have any questions to ask.

I will note that most of the submissions are to the same effect. So in that regard, there may not be that many questions in various areas. But, in any event, we will stop at each of them and ask if there are any

questions.

***CMD 15-H7.2**

Written submission from Bruce Power Inc.

MR. LEBLANC: So the first written submission is CMD 15-H7.2 from Bruce Power Inc.

Any questions?

No. Since there are no questions, we will -

-

THE PRESIDENT: It talks about the Cobalt-60, 40 percent of all single-use globally. Is that a growing kind of business or are there any alternatives coming along, competing procedures?

MR. McINTOSH: It's Scott McIntosh for the record.

A 40 percent number globally of single-use medical devices being sterilized by gamma is pretty stable. It has remained stable. It probably moves a couple of percents depending on supply and the mix of products but it really has remained largely stable probably for a decade, thereabouts, and we don't see it gravitating a great deal.

Your second question, though -- but, you know, your second question really was is it a growing business and the answer is yes, the sterilization of

single-use medical devices in general is a growing business. Therefore, the pie is getting bigger, if you would. So despite the fact that the share remains roughly stable, the business is growing nicely.

And are there alternatives? There are always -- there are always alternatives that we watch for. Of course the biggest alternative, with about 50 percent of share, is the use of ethylene oxide gas and so it's a fumigation process for medical devices. It's performed worldwide, it's simple and cheap, but it can only be used on some products.

But the one that is potential in the future, probably a little further out than most would like, is the use of machine-sourced radiation of some source -- either E-Beam, which is in heavy use but quite limited, or X-ray, which is at this point quite simply far too inefficient, very uneconomical -- someday may be an alternative, today not so much.

THE PRESIDENT: Thank you.

MR. LEBLANC: Any other questions on Bruce?

No.

***CMD 15-H7.3**

**Written submission from
Ontario Power Generation Inc.**

MR. LEBLANC: So the next written submission is CMD 15-H7.3 from Ontario Power Generation Inc.

Madame Velshi?

MEMBER VELSHI: A question for Nordion. So with the shutdown of the Pickering units, I guess you lose a major supplier of your Cobalt-60. So do you have an alternate supplier lined up or this will just cut your share of the pie?

MR. McINTOSH: Scott McIntosh for the record.

The second alternative you presented there would be a terrible outcome for us. No, we don't intend to simply lose a supplier and, I will call it, abdicate the supply to others. The truth of the matter is that we are the most capable supplier of bringing on new supply. So the danger would be if a Pickering shutdown and we didn't find other supply that nobody would and the medical device industry would have a very, very large adjustment to make. So in fact we are in the process of evaluating just those exact alternatives now. So we are going through picking from options and working with those reactor operators

around the world.

***CMD 15-H7.4**

**Written submission from
Queensway Carleton Hospital**

MR. LEBLANC: Thank you.

The next written submission is CMD 15-H7.4 from the Queensway Carleton Hospital.

THE PRESIDENT: I have a question on this. Are all hospitals using your material, your supply of Cobalt?

MR. McINTOSH: I will take that. It's Scott McIntosh for the record.

So, you know, we don't supply our products directly to these hospitals. We instead supply -- in the case of Cobalt we supply it to either a medical device manufacturer that sterilizes or a contract sterilizer such as our parent that sterilizes and the hospital would buy those medical devices. So it would seem inconceivable that there is any hospital, certainly in North America, quite possibly the world, that doesn't use products that our product touches, so every hospital in Canada certainly.

THE PRESIDENT: Is the general population aware that this sterilization is using nuclear material?

MR. McINTOSH: Probably not. Now, it's a great question. I think we have a great deal of work to do with the general public to make them aware of the general benefits of having a nuclear business in fact.

You know, it's not just Nordion. We take a lot of pride at Nordion and it's not just the Cobalt and sterilization, of course, it is the medical isotopes that are, you know, present through a Lantheus or others, present in almost every hospital in the country, or many hospitals in the country, certainly.

We take a lot of pride that we impact the lives of so many people, but in fact the nuclear business in Canada impacts -- you know, it's broader than just Nordion, whether it be Canadian Nuclear Laboratories or Bruce Power, OPG, all supplying this material for general use around the world. I think your point is an interesting one. We have a lot of work to do probably to raise general awareness.

MR. LEBLANC: The next submission is from Sterigenics International LLC, CMD 15-H7.7. I jumped a few, sorry. I will go back.

THE PRESIDENT: Yes.

***CMD 15-H7.5**

Written submission from

Kanata North Business Improvement Area

MR. LEBLANC: The next one is from the Kanata North Business -- I mixed hospitals. The next one is from the Kanata North Business Improvement Area, CMD 15-H7.5.

No questions.

***CMD 15-H7.6**

Written submission from the Ottawa Hospital

MR. LEBLANC: I will proceed with the written submission from The Ottawa Hospital, CMD 15-H7.6.

***CMD 15-H7.7**

Written submission from

Sterigenics International LLC

MR. LEBLANC: The next submission this time is Sterigenics International LLC, 15-H7.7.

THE PRESIDENT: You know, I would have found it useful to see the whole empire chart and when the Nordion division fits into and the various

interrelationships and maybe synergy on some of your business so I can understand how you are situated.

MR. McINTOSH: It's Scott McIntosh, for the record.

We didn't provide that. It's a great idea and we perhaps should have but if you would permit me I can take a moment and perhaps describe for you how the business is structured and where Nordion does fit in the broader business.

So Sterigenics, until they purchased Nordion, was essentially a single business. That is they sterilized mostly medical devices. They operate approximately 40 facilities around the world that receive medical devices from manufacturers, sterilize them, then ship them out to wherever the device manufacturers want. It was a single business.

When they bought Nordion, Nordion was simply their largest supplier and the most critical supplier given the difficulty in sourcing Cobalt. When that business purchased Nordion, in fact what Sterigenics International did was make three very distinct businesses within their empire.

The legacy business that I just described, the sterilizer, Gamma Technologies, which is the Cobalt provider to their business and to others, their competitors

as an example, and Medical Isotopes, that is the molybdenum-99 and other business.

So there are three businesses within the Sterigenics empire, run to some degree independently, certainly from the marketing and customer side very independently. Nordion of course is made up of two of those businesses. So from a health safety, regulatory location, senior management, we operate it as a single business largely based here in Ottawa.

THE PRESIDENT: Thank you.

***CMD 15-H7.8**

**Written submission from
Canadian Nuclear Laboratories**

MR. LEBLANC: The next submission is from the Canadian Nuclear Laboratories, CMD 15-H7.8.

***CMD 15-H7.9**

Written submission from TRIUMF

MR. LEBLANC: The next submission is from TRIUMF, CMD 15-H7.9.

Dr. McEwan?

MEMBER MCEWAN: Thank you. So there's just

one figure in this that surprises me. In the bottom of the first page:

"Nordion is regarded internationally as a major supplier of medical isotopes, supplying approximately 2.5M patient dosages ... [just] from Vancouver [alone] ..."

That seems an awfully high figure for what Vancouver produces. I'm impressed if it's correct.

MR. BURNETT: Yes. The majority of that would come from two products, one that has grown significantly in recent years, Strontium-82, and the other one, a legacy product, we are one of only two manufacturers in North America, Iodine-123, which is still a very sizable business in terms of the number of patients that are impacted. And there is a host of other isotopes currently produced out of TRIUMF as well on our cyclotrons.

MEMBER MCEWAN: But really 2.5 million? I mean if you think there is only 20 million medical isotope procedures performed annually in the States...

MR. BURNETT: Yes. There is product shipped abroad and exported from TRIUMF as well from our facility there. So they might be looking at the total output of the facility rather than North America.

***CMD 15-H7.10**

**Written submission from
Jim Watson, Mayor, City of Ottawa**

MR. LEBLANC: The next submission is from Mayor Jim Watson, from the City of Ottawa, CMD 15-H7.10.

***CMD 15-H7.11**

**Written submission from
The Canadian Association of Nuclear Medicine**

MR. LEBLANC: The next submission is from The Canadian Association of Nuclear Medicine, CMD 15-H7.11.

***CMD 15-H7.12**

**Written submission from
the University of Missouri Research Reactor Center (MURR)**

MR. LEBLANC: The next submission is from the University of Missouri Research Reactor Center, CMD 15-H7.12.

THE PRESIDENT: Okay. There are a lot of promises being made by your partners here with you. I'm going to ask you the same question. Are they going to be ready somewhere in 2016?

MR. BEEKMANS: So in February of this year we announced our project with General Atomics utilizing their selective gaseous extraction technology implemented at the Missouri University Research Reactor. At that time the timeline for the project, as we stated, was to have product commercially available by the end of 2017.

The project is ongoing as we speak. There was a year of work take place before we announced this project. Licences are being applied for in terms of amendments for their facility. More importantly, all of the contracts are in place between the parties as to the project to implement, the licensing of the technology and the ongoing supply relationship between the parties for the next 20 years.

We have a lot of confidence in the staff at the Missouri University Research Reactor. We have worked with them for over 20 years on products like TheraSphere that they have irradiated and supplied very reliably week in/week out.

So we think the combination of the technology and expertise from General Atomics, the reactor reliability design and expertise at MURR and our ability to process and provide a regulated product to the market and transport it effectively around the world is second to none.

THE PRESIDENT: But the facility itself is also quite -- I was going to say old. I don't remember when it started but it has been around for a while.

MR. BEEKMANS: Yes, it has been around for a while. I guess what makes it different is the simplicity of the design. It's a very modular design, very robust and the components can be changed out very quickly and very readily.

They changed the beryllium matrix in a matter of a week and that is the project that BR2 is offline for 16 months to do in Belgium. So it's quite a different design, different magnitude and provides us with 52 weeks of service a year, which no other research reactor can come close to.

THE PRESIDENT: Does it require U.S. licensing?

MR. BEEKMANS: It will require an amendment to their licence with the U.S. NRC, yes.

THE PRESIDENT: Okay. Thank you.

***CMD 15-H7.14**

Written submission from

**Marianne Wilkinson, Councillor Ward 4, Kanata North, City
of Ottawa**

MR. LEBLANC: The next submission is from
Councillor Marianne Wilkinson from Ward 4, Kanata North,
City of Ottawa, CMD 15-H7.14.

***CMD 15-H7.15**

Written submission from

Women in Nuclear (WiN) Canada

MR. LEBLANC: And the last written
submission is from Women in Nuclear (WiN) Canada, CMD 15-
H7.15.

So that's the end of the submissions and
with respect to this matter it is proposed that the
Commission confer with regards to the information that it
has considered today and then determine if further
information is needed or if the Commission is ready to
proceed with a decision and we will advise accordingly.
Thank you.

THE PRESIDENT: I was amiss. I always give
the proponent the last chance to say whatever you want to

say. So even though the final words were said, if you do have some things you want to say, now is a good time.

MR. McINTOSH: It's Scott McIntosh for the record. Thank you, Mr. Binder.

I will reiterate a little bit of what I said in my opening remarks.

Nordion has operated safely and proudly for a very, very long time. We are a symbol, in my view, of the benefit that society gets from a nuclear industry and we protect that symbol very, very closely. We are proud to do what we do safely and we expect to be here for many decades.

I want to thank you for the opportunity to present here today.

THE PRESIDENT: Thank you.

We will reconvene at 1:45. Thank you.

--- Upon recessing at 12:59 p.m. /

Suspension à 12 h 59

--- Upon resuming at 1:47 p.m. /

Reprise à 13 h 47

THE PRESIDENT: Good afternoon and welcome to the continuation of the public hearing of the Canadian Nuclear Safety Commission.

Mon nom est Michael Binder, je suis le président de la Commission canadienne de sûreté nucléaire.

Je souhaite la bienvenue aux gens ici présents and welcome to all of you who are joining us through the webcast or participating by videoconference.

I would like to introduce the Members of the Commission that are with us here today.

On my right are Dr. Moyra McDill and Monsieur Dan Tolgyesi. On my left are Ms Rumina Velshi, Monsieur André Harvey and Dr. Ronald Barriault.

We haven't heard from Marc yet --

MR. LEBLANC: Not yet, no.

THE PRESIDENT: -- but we will soon.

We have with us also Marc Leblanc, our Secretary to the Commission, and we also have with us Ms Lisa Thiele, Senior General Counsel.

The hearing this afternoon is to consider the application by Ontario Power Generation for the renewal of the Nuclear Power Reactor Operating Licence for the Darlington Nuclear Generating Station.

Marc...?

MR. LEBLANC: Yes, a few opening remarks.

This is Part 1 of the public hearing. The Notice 2015-H-04 was published on May 26th of this year.

Submissions from OPG and CNSC staff were due

on July 20th. However, they were filed much earlier, on July 3rd for OPG's submission and on July 8th for CNSC staff's recommendations, and we offer our thanks because that assists all of us in preparing for these proceedings.

August 12th was the deadline for filing of supplementary information. I note that presentations have been filed by CNSC staff as well as OPG.

Part 2 of the public hearing is scheduled for November 2nd to 5th, 2015 and will be held at the Hope Fellowship Church in Courtice, Ontario. The public is invited to participate either by oral presentation or written submission at the Part 2 hearing. The deadline for the public to file a request to participate and a written submission is September 28th, 2015.

In a notice published on March 10th, 2014, the CNSC announced that it was allotting funds under its Participant Funding Program to help Aboriginal groups, members of the public and other stakeholders interested in reviewing and commenting on the licence application submitted by OPG, to prepare for and participate in Hearing Part 2.

This opportunity to apply for participant funding was reopened later in the summer due to the extension of the licence and postponement of the hearing initially scheduled for the fall of 2014.

The Commission received several requests for funding. A Funding Review Committee, independent of the Commission as it is made up of external members not related to the CNSC, rendered its decision and provided funding to eight applicants. The decision is available on the CNSC website.

Mr. President.

THE PRESIDENT: Before we proceed with the presentations, I would like to acknowledge the participation of some other officials from other departments, starting with Ms Nardia Ali and Mr. Duck Kim from Environment Canada. I assume they are here with us today.

MR. KIM: Yes.

THE PRESIDENT: Okay.

We and also have Mr. Dave Nodwell and Mr. Al Suleman from the Office of the Fire Marshal and Emergency Management that are here with us today. Welcome.

And I understand that we are going to have two representatives from Fisheries and Oceans coming to us via teleconference.

Ms Jennifer Wright and Ms Sara Eddy, can you hear us?

UNIDENTIFIED SPEAKER: Yes, we can.

***CMD 15-H8.1/15-H8.1A**

**Oral presentation by
Ontario Power Generation Inc.**

THE PRESIDENT: Okay, welcome.

So I would like to start the hearing by calling on the presentation from Ontario Power Generation, as outlined in Commission Member Documents 15-H8.1 and 15-H8.1A.

I understand that Mr. Glenn Jager will make the presentation. Over to you, sir.

MR. JAGER: Good afternoon, President Binder and Members of the Commission. My name is Glenn Jager, OPG's Nuclear President and Chief Nuclear Officer. I have worked for OPG and OPG's predecessor company Ontario Hydro for the past 34 years, at both sites, and I have held various positions, including being certified as a Shift Manager, Director of Operations and Maintenance, and most recently Site Vice President at Pickering Nuclear Generating Station, and now, the Chief Nuclear Officer.

As head of OPG Nuclear, I am responsible for ensuring our nuclear plants are operated to the highest standards and that safety remains our number one priority. I will be here for most of today but regret I have to return to Toronto for a Board meeting later today.

I have here with me today Brian Duncan, the Senior Vice President of Darlington Nuclear. Brian is responsible for the safe and reliable operations of the Darlington station. He joined Ontario Hydro in 1980 as a nuclear operator and has held a variety of increasingly responsible positions at the Bruce, Pickering and Darlington nuclear stations. Brian lives in Whitby with his wife and three kids.

Also here with me today is Dietmar Reiner, the Senior Vice President of Nuclear Projects, who is overseeing the Darlington Refurbishment. Dietmar joined Ontario Hydro as an engineer in 1985. He has held a number of increasingly senior positions in the company's Nuclear, Hydroelectric and Power Systems Operations divisions, as well as corporate support functions. Dietmar and his wife have recently moved to Courtice.

Also with me today providing support is Laurie Swami, Senior Vice President of Decommissioning and Nuclear Waste Management, and Steve Woods, our Chief Nuclear Engineer.

We are here today in support of our request for a licence renewal of the Darlington station which expires on December 31, 2015. We have requested a renewed licence term for 13 years.

I will start off today's presentation with a

brief overview of Ontario Power Generation and our extensive engagement in our local community. I will speak briefly about our Darlington plant and how proud I am of the performance of this plant. It's one of the best performing nuclear stations in the world.

Brian Duncan will then expand on the performance at the Darlington station in the CNSC's Safety and Control Areas, in areas like radiation safety, environmental protection, human performance, physical design and safety improvements. We will show that our performance to date and the programs we have in place will ensure performance is maintained at a high standard throughout the next licence period.

Dietmar Reiner will then provide an overview of our current refurbishment activities, the facilities we are constructing, the scope of the work and the timelines involved.

This timeline is at the heart of our request for a 13-year licence. We believe a 13-year licence is the safest way to manage refurbishment. It would allow all four Darlington units to be refurbished under the same set of regulatory requirements and that would improve nuclear safety through consistency and configuration management between the units.

Finally, I will wrap up the presentation

with a brief summary.

We have a few short videos throughout the presentation that I hope you will find both informative and useful.

The Darlington nuclear station forms part of the backbone of the electricity supply to Ontario, Canada's economic engine. Along with Pickering and Bruce Power, nuclear provides Ontario with about 50 percent of its power. This power is reliable, it's affordable and it's one of the lowest greenhouse gas emitting sources of power available in Ontario and worldwide. Not only that, the Darlington station was the first station outside of the U.S. to be recognized by its industry peers as one of the top performing stations in the world and the first station to receive that recognition for two consecutive evaluations.

For these reasons, nuclear power from Darlington will continue to supply Ontario for decades to come and we continue to invest in the station to ensure its ongoing safe operation.

At the heart of this is our investment in the mid-life refurbishment of the station, one of the biggest infrastructure investments in Canada and one of the most important. It's an investment we have been planning for years and one that will take many years to complete.

It will start in October 2016 and finish in 2028. Once complete, though, the refurbishment of Darlington will continue to provide our children and our children's children with 20 percent of their electricity needs.

Operating a major nuclear generating station alongside the largest project in our company's history requires a great deal of planning and oversight. We have spent six years planning and benchmarking this refurbishment, which Dietmar will go through in more detail.

Our benchmarking has shown that the real key to success is teamwork. As Chief Nuclear Officer, I'm responsible for the performance of the team in ensuring the safe operation of the plant and execution of the refurbishment program.

In order to ensure this, we have recently reorganized. Today, the entire nuclear organization, from operations to projects to engineering, operates under a single Nuclear Management System and the President of OPG Nuclear. What that means is one Engineering Change Control Program, one Nuclear Safety Program, one team and one goal.

As you know, no team can succeed without the support of those around them. Without the support of the communities around us, we wouldn't be one of the top-performing stations in the world and we wouldn't be about

to start refurbishment and we wouldn't be requesting a 13-year licence.

The Darlington station is located in First Nations territory and OPG acknowledges the Haudensaunee, Mississauga's Ojibways and the Huron. The waste produced at Darlington is stored in the traditional territory of the Saugeen Ojibway Nation.

We are committed to maintaining and growing our relationships with them and nine other First Nations and Métis communities that have shown an interest in our nuclear operations. This is in keeping with our First Nations and Métis Relations Policy that sets out objectives for respecting Aboriginal rights and interests and developing relationships and partnerships.

As an example, we are leading a partnership with Aboriginal communities, industry and unions to identify job opportunities in the region and build job skills among Aboriginal members to fill those jobs.

We also have a three-year program to increase Aboriginal participation in the refurbishment project. This program is supported by almost 30 representatives who will be matching a \$250,000 annual contribution from the Ministry of Aboriginal Affairs to create Aboriginal apprenticeships.

At a more fundamental level, we meet

regularly with Métis and First Nations to consult on issues and concerns and to work on areas of common interest.

These relationships continue to mature and we are committed to further building trust and understanding with our First Nations and Métis partners.

The understanding and support of First Nations and Métis is fundamental to another Darlington licence that we need to operate to and that is our social licence, or the ongoing approval of the community and other stakeholders for our current and ongoing operations. This is not something we can get by appearing every five or 13 years. It requires a daily commitment. It means being a part of the community, sharing its values and supporting what matters to the community and to ourselves.

In Clarington, that means meeting regularly with elected representatives and community members. It means joining organizations and boards and partnering with dozens of environmental, educational and community-building groups. We believe in giving back to Clarington to improve the quality of life for the duration of our operations and beyond. It's a commitment we take seriously and that we demonstrate every day through our support of the community's safety and environmental causes, among others, because employees like me don't just work in the region, we live there as well.

Another part of our commitment to the community is through sharing information about our operations. We recognize that nuclear power remains mysterious to most outside the industry and that the Darlington station is largely separated from the community by fences and large berms.

Key to our social licence is understanding and we work with the community to understand what information they would like to receive and how they want to receive it and so we have developed multiple vehicles, from toll-free numbers to one-on-one briefings, to help the community understand our operation and any impacts it might have. Our Visitor's Centre at the Darlington Energy Complex doubles as a community meeting place and our annual Open Doors events have attracted over 5,000 visitors in the past two years.

Our last Open Doors event in June allowed visitors to tour through the reactor mock-up facility and the Darlington site. The feedback was overwhelming and what it showed me was that social licence can go beyond simple approval of our operations. The community members that showed up were more than just passive supporters, they were advocates for the project, vested in the future of Darlington as much as we are.

There is a short video from that event that

we have.

--- Video presentation / Présentation video

"The Darlington Station is an important part of the Clarington community, where support for the station is strong. Eighty percent of Clarington residents have a positive impression of the station and support the refurbishment of Darlington Nuclear.

OPG provides the community with regular updates on emergency preparedness, station operations, environmental topics, and current events in many ways, including newsletters, presentations, websites, and face-to-face meetings.

OPG has conducted over 100 tours of the mock-up facility and has hosted public open houses, where over 5,500 people have attended."

"Well, yeah, it's a nuclear reactor mock-up; it's pretty awesome."

"I didn't expect it to be this

accurate and this big."

"It's way bigger than I thought."

"It's high-tech."

"We had no idea versus whatever we saw on TV, so this is really, really cool."

"I wasn't expecting this when I first came in. I thought we'd just be reading about the reactors and whatever is happening, but then we got to see this real-life example about what is inside each of the units."

"It's as close as you're ever going to get to a reactor, and it's the real thing."

"I'm visiting from England and we've come to see relatives. I'm very please from what I see. If this is world-standard then, you know, I feel a bit more comfortable about it."

"It reaffirmed my stance on it that -- I think it's one of the best

power generation techniques used."

"You know, clean, safe power and, you know, lots of jobs for the local community, so I'm, you know, a big fan of that idea."

"It's important. It's part of our future, of Ontario, for electricity; right?"

"Yeah, we support the renewal of licence."

"I'm sure that if OPG were to continue operating at high standards and being a world-class facility, that shouldn't be a problem to extend their licence."

"The support of the community is the result of years of safe operations, but it is also because of the open dialogue the station has with the local residents, First Nations, and Métis communities, as well as business and community organizations."

MR. JAGER: Members of the Commission, we are requesting a licence term of approximately 13 years, to

December 1st, 2028, to cover life extension activities including refurbishment on all four of our reactor units. This is a significant investment of over \$12 billion and a very complex project.

Our Commission Member Document outlines why we conclude a 13-year licence term is necessary, acceptable and appropriate. I will highlight a few more of the more important points.

A 13-year operating licence is the safest way to manage refurbishment because it would allow all four Darlington units to be refurbished under the same set of regulatory requirements. This will enable us to assure nuclear safety through consistency and configuration management between the units.

Our team at OPG has already completed comprehensive assessments to cover long-term operation well beyond December 2028 as described in the CNSC Regulatory Document, RD-360, "Life Extension of Nuclear Power Plants."

Significant investments in safety improvements have been made and will continue throughout the 13-year refurbishment project.

Finally, Darlington is one of the top-performing nuclear plants in the world. We are pleased that the CNSC has rated our station as fully satisfactory for the past seven years. In addition, our international

peer evaluations have consistently recognized our station's high performance. All of us at OPG remain committed to ensuring this will not change during the next licence term.

I will now pass the presentation over to Brian Duncan, who will show how our performance to date and the programs we have in place will ensure performance is maintained at a high standard throughout the 13-year licence period.

Brian?

MR. DUNCAN: Thanks, Glenn.

Brian Duncan for the record.

In my position as Senior Vice President of Darlington Nuclear, I am responsible for ensuring the Darlington plant is operated and maintained with safety as the overriding priority. Over the next few slides I will review the performance of the Darlington station for the CNSC's Safety Control Areas.

I will start off by saying that across our nuclear fleet, safety is our core value. It underpins everything we do at our stations. Safe operations are at the heart of our social licence and of our operating licence.

Our operations at Darlington continue to result in some of the best safety performance in Canada and among all nuclear power plants worldwide. Over the last

licensing period, there were no radiation exposures at Darlington that exceeded our own dose limits and our public radiation dose is just a fraction of the regulatory limit.

Darlington also produces some of Ontario's most reliable, lowest-cost electricity. We produce about 20 percent of Ontario's electricity at 5.7 cents a kilowatt hour. Only regulated hydro costs less.

Our reactors are consistently named among the worlds top-performing CANDU units. As Glenn mentioned in his opening remarks, our performance has been recognized by our industry peers and in CNSC staff's most recent assessment of Canadian nuclear power plant performance.

All of us remain focused on continuous improvement. The objective of our business plan is to continue Darlington's "Journey of Excellence" while positioning the station for refurbishment and beyond. That has been true up until now and will remain true throughout the licence period.

We are proud of our safety record and work hard to maintain a safe work environment. Our conventional safety performance remains strong. Darlington's All Injury Rate has been better than target since 2010 and we recently achieved 5 million hours without a Lost Time Accident. Although I'm pleased with that achievement, I'm not satisfied, so I will continue to focus on improving safety

and demonstrate that personal safety, nuclear safety and environmental safety are priorities that supersede all others.

In recognition of our outstanding safety performance and programs, last year OPG received a Canadian Electrical Association Award for Safety Excellence for the third consecutive year.

With respect to radiation safety, over the licensing period there were no radiation exposures at Darlington that exceeded regulatory or our own much more stringent administrative dose limits. Collective Radiation Exposure is an industry standard measure. On average, over the last three years, our performance is significantly better than the CANDU industry standard. We attribute this success in a large part to our people and the programs and equipment they have developed to minimize radiation exposure.

Some highlights include:

Tritium dose reduction by innovative plant equipment alignments and the use of portable driers;

An industry best practice program for alpha hazard classification and control;

A fourfold reduction in reactor face dose rates during outages was achieved by installing a combination of overhead shielding canopies and end-fitting

shielding tiles;

The use of remote real time gamma and tritium monitors during outages has also reduced dose by minimizing the need for people to enter containment and manually perform routine gamma and tritium surveys.

As I have mentioned, nuclear safety is paramount to all of us at Darlington. Central to this is the "defence-in-depth" concept where multiple overlapping engineered, administrative and people-based barriers are in place to protect the public, environment and plant personnel. Our engineered barriers have a robust design and our process and safety systems are highly reliable and well maintained.

But we learned from Fukushima that even the strongest defence-in-depth systems can be enhanced. We have taken the key lessons learned from that event and incorporated changes to further enhance our nuclear safety.

Of particular note, we have implemented Emergency Mitigating Equipment, or EME, which is a mobile and flexible means of providing cooling water to the reactor following a beyond design basis event or severe accident. I am pleased to report that all items in the CNSC's Fukushima Action Plan have now been closed.

But again, we have not stopped improving. In addition to our EME, we are currently installing five

major safety improvements that will further improve our nuclear safety. I will have more details on those later in the presentation.

Our performance is also strong in all areas of environmental protection. Our targets for radiation dose to the public are much more stringent than regulatory limits and we strive to keep them as low as reasonably achievable. To date, the public radiation dose from Darlington remains a fraction of 1 percent of the regulatory limit.

We were the first nuclear generating station in North America to achieve Environmental Management System compliance with ISO 14001, Environmental Management.

Our Environmental Monitoring Programs in the vicinity of Darlington assess the impact of operations on the environment and human health. Annual results are made available to our community and the public on our website.

In June of this year, Fisheries and Oceans Canada issued a *Fisheries Act* authorization for continued operation of the Darlington cooling water system. As part of our Environmental Assessment Follow-up Program, we will be monitoring the effectiveness of our mitigation measures.

Darlington is certified by the Wildlife Habitat Council (WHC) under its Wildlife at Work Program and is a repeat recipient of the "Corporate Habitat of the

Year" award for a comprehensive wildlife habitat management program.

Our Nuclear Management System provides a framework that establishes the processes and programs required to ensure OPG achieves its safety objectives, continuously monitors its performance against those objectives, and fosters a healthy safety culture.

Darlington is compliant with CSA Standard N286, Management System Requirements for Nuclear Facilities and will be transitioning to the new version by the end of this year.

Internally, we have a well-established corrective action program, incorporating self-assessments, benchmarking, and independent audits. Industry peer reviews are also regularly performed at all of our nuclear stations.

We periodically evaluate our own safety culture to recognize positive attributes and to identify areas for further improvement. A station-wide assessment conducted at Darlington this year concluded there was a healthy nuclear safety culture, a healthy respect for nuclear safety, and that nuclear safety is not compromised by production priorities.

One of our goals is to continue this high level of industry-recognized performance, while also taking the opportunity to learn from others best practices.

The objective of our Human Performance Program is to reduce the frequency and severity of events by managing defenses and reducing human errors. Our goal is zero events.

This starts with awareness, understanding, and commitment by all levels of the organization. It involves promoting individual and department ownership and accountability and it drives multi-faceted initiatives all the way from the front line worker to the leadership level.

Our training programs are also used to develop and maintain competent personnel to safely operate, maintain, and improve both plant and human performance.

We have initiatives underway to address the nuclear industry's demographic challenges, especially in the areas of recruitment and knowledge management.

In addition to traditional full-time regular staffing services, non-regular hiring strategies have been devised to meet short-term requirements.

To ensure a continuing supply of leaders, a company-wide succession planning process is in place to identify and develop leadership talent.

Darlington has a proven track record of safe and reliable operating performance.

Our Operations Program ensures the safety of the public, environment and plant personnel. It also ensures high

levels of equipment reliability during both normal operation and accident conditions.

This program establishes safe operating practices and processes within all of our facilities. It provides our operators the ability to ensure facilities are operated in compliance with the *Reactor Operating Licence*, the *Operating Policies and Principles (OP&Ps)*, *Safe Operating Envelope (SOE) limits*, and other applicable regulations and industry standards.

In the case that reactor operation deviates from normal, Darlington has Abnormal Incident Manuals, Emergency Operating Procedures, Emergency Mitigating Equipment (EME) Guidelines, and Severe Accident Management Guidelines (SAMG) in place.

One of the best indicators of operating performance is Forced Loss Rate (FLR). This indicator reflects the overall effectiveness of our operating and maintenance programs. Over the past several years, the four units at Darlington's have operated with a low FLR. During the current licensing period, all Darlington units operated with a minimal number of unplanned transients and reactor trips, another strong indicator of operating performance.

Periodic inspections are completed on all major components and concrete structures to assure ongoing

fitness for service. Component and equipment health is evaluated and trended by means of technical evaluations, inspections, maintenance, and testing in accordance with licensing codes and standards.

Major components such as fuel channels, feeders, and steam generators have specific life cycle management plans. These plans are communicated to CNSC staff regularly.

We are actively leading the industry on the Fuel Channel Life Management Project as well as other fuel channel research and development activities. We are confident the Darlington fuel channels will be safe to operate, with margin, until each unit comes out of service for refurbishment.

CNSC staff have concurred with our position that the Darlington fuel channel components are safe to continue operating to at least 235,000 effective full power Hours.

As you can see on this slide, this easily meets our needs.

Regarding concrete integrity, which has been a topic of interest in previous public hearings, the inspection results from each unit's concrete containment structure inspection campaigns are compared to previous inspection results. No significant changes were observed and the concrete containment structures were confirmed to

be performing as expected.

As I mentioned earlier, the physical design of Darlington station incorporates a defence-in-depth approach with multiple redundant safety systems in place to ensure the safety of the workers, the public and the environment.

Our robust design and modification program ensures the ability of systems, structures and components to meet and maintain their design basis functions.

All design changes are prepared and executed in accordance with our Engineering Change Control, or ECC, process. The ECC program ensures all plant modifications are planned, designed, installed and commissioned within the parameters of the design basis and plant licensing conditions. Our supply chain works with vendors and closely monitors vendor quality to ensure that equipment procured meets design and quality requirements.

Although studies by the Geological Survey of Canada conclude Darlington is located in a region of low seismic activity, the reactors and safety systems are designed and constructed to withstand a severe seismic event. As such, a seismic event is a Design Basis Event, and we have dedicated equipment, systems and procedures for ensuring safe reactor shutdown and continued fuel cooling.

Whether it's an earthquake or a flood, our analysis shows Darlington is safe.

We've conducted a comprehensive safety analysis of Darlington, and it has shown the likelihood of a serious accident remains very low. Nonetheless, we will continue to invest to further improve the safety of the station, through the implementation of Emergency Mitigating Equipment and Safety Improvement Opportunities. These physical improvements to the plant have been incorporated into the Darlington Probabilistic Safety Assessment, or the PSA. This assessment concludes there is a low public risk, and the risk is reducing further. Even in the event of a nuclear incident, our investments would significantly lessen the consequences.

When it comes to public safety, we're never satisfied. Following the Darlington Refurbishment and Continued Operation Environmental Assessment in 2012, the following five modifications are being installed at Darlington to further improve public safety: We are adding a third Emergency Power Generator, a new Containment Filtered Venting System (CFVS). We are enhancing our Powerhouse Steam Venting System (PSVS), an improved Shield Tank Overpressure Protection (STOP) system and a new Emergency Make-up to the Heat Transport System. These large capital investments will help make a safe plant even

safer.

We regularly review the safety of the station in likely and unlikely scenarios. The 2015 Darlington PSA results show that the Severe Core Damage Frequency for individual hazards is well below the safety goal limit. Moreover, these results are below our safety goal target which is 10 times tighter than this limit.

Similarly, the Large Release Frequency, or LRF, for individual hazards is well below the safety goal limit. All of the LRF results are below our safety goal target, with the exception of seismic hazards. To address this, an action plan is in place to further reduce the estimated seismic risk for Darlington. Our plan includes implementing Phase 2 EME as well as completing the previously mentioned safety improvements.

A measure of the whole-site risk associated with Darlington has been estimated using a simplified methodology accounting for all units and hazards. The results for Large Release Frequency for our site-wide risk is better than our safety goal limit for each hazard per unit. The estimated risk is even lower with the benefits of the SIOs.

Finally, to facilitate intervenors for the upcoming Part 2 Public Hearing, we have posted a summary of the Darlington PSA results on our website.

While our goal is accident prevention, we remain prepared in the event of an emergency. Our readiness to respond to a Beyond Design Basis Event has been recognized as industry-leading and our emergency plans have been practiced and integrated with all levels of government.

In addition, Emergency Mitigation Equipment is available at both Darlington and Pickering, procedures are issued, staff are trained, and our response has been practiced in a number of drills and exercises.

In accordance with provincial requirements, outdoor public alerting sirens and indoor phone alerting systems are operational in the Municipality of Clarington and are tested on a regular basis by the Region of Durham.

We're also participating in a Wireless Public Alerting Service research and development project that will introduce emergency cell broadcast technology to Canada. A trial is planned in the Region of Durham next year.

In response to new requirements, OPG is working with various government organizations on pre-distribution of potassium iodide pills to all residents, businesses and institutions within the primary zone prior to the end of this year. In addition, potassium iodide pills will be

made available to residents within the secondary zone. A media and communications plan will be implemented to support the initiative. Some of that is what I have.

Our biggest test of emergency preparedness took place in 2014. In May we led the execution of the Exercise Unified Response where more than 1,000 participants from 54 federal, provincial, municipal and non-government agencies participated over the course of three days. The results demonstrate that there are robust emergency plans in place at all levels to deal with a nuclear emergency. Further enhancements to those plans are being implemented as part of the lessons learned.

The following video will provide a better overview of the 2014 Exercise, Unified Response, and the Emergency Mitigation Equipment.

--- Video presentation / Présentation video

"Safety is Ontario Power Generation's number 1 priority. As an operator of nuclear power plants, OPG has multiple safety systems in place to prevent a nuclear emergency from ever happening. But creating plans is only one part of preparing for an event. Equally important is the regular testing of those plans,

procedures and capabilities.

In May of 2014, Ontario's emergency response capability was strengthened when OPG, municipal, provincial and federal governments conducted a three-day mock nuclear emergency exercise. Fifty-four (54) agencies participated, including the Canadian Nuclear Safety Commission, Health Canada, the Province of Ontario, Region of Durham and Municipality of Clarington.

The exercise tested OPG and participating agencies on their response to a simulated nuclear emergency and radioactive release at Darlington Nuclear. The exercise provided OPG the opportunity to test the effectiveness of our on-site response plans and the deployment and operation of the emergency mitigation equipment.

OPG's emergency operation centre was activated, as were operation centres at the local, regional,

provincial and federal level.

As part of the scenario, the Province of Ontario ordered a simulated evacuation for local residents, and Durham Region activated the public alerting sirens around the station.

Health agencies also participated, with the Ministry of Health and Long-Term Care deploying its Emergency Medical Assistance team, which included a mobile hospital, and Lake Ridge Health Bowmanville simulated treatment of a contaminated casualty.

Durham Region established an emergency workers' centre and liaised with Durham Regional Police Services, who practised their neighbourhood patrol.

The federal government also enacted their response plans. Joints operations were conducted by field teams from federal and provincial responders, including teams from

Natural Resources Canada, that flew over the area with radiation detectors and shared survey information with the province to guide their decision-making.

The exercise also tested communications with the public through a simulated media web site that was used to provide news articles, radio broadcasts and twice-daily news video broadcasts which, along with social media inserts, made the exercise more realistic for participants.

OPG created press releases and emergency bulletins that were posted and shared with other organizations to ensure coordination of public messaging.

Exercise Unified Response demonstrated that there is an effective, coordinated response between OPG and the local, regional, provincial and federal governments and agencies with defined roles in

nuclear emergency planning. The lessons learned will be used to enhance the current capability of every nuclear response organization to respond to a nuclear emergency, improving public safety today and throughout the licence term."

MR. DUNCAN: Darlington has a security program that complies with the CNSC regulatory requirements for ensuring safe and secure station operation. A wide range of state-of-the-art security equipment is deployed around and throughout the Darlington site.

Performance Testing Program exercises are routinely executed to assess the integrated response capabilities of our nuclear security armed and unarmed elements against adversaries equipped and performing within the Design Basis Threat. We also have an off-site response arrangement with the Durham Regional Police Service.

In addition, we recognize the frequency of cyber threats is increasing for all spectrums of industry. We take cyber security very seriously and have a cyber-security program that protects our computers and software. The computers used for control and monitoring of our units are segregated from external sources and are protected from external attacks.

Darlington is continually working to reduce the amount of low and intermediate-level nuclear waste that it produces, thereby reducing our environmental footprint so that future generations will not be unduly burdened.

Low and intermediate-level waste from Darlington is transported to the Western Waste Management Facility for storage. The Deep Geological Repository, which is currently in the licensing process, will be the long-term storage location for this waste.

Darlington has two irradiated fuel bays for storage of used nuclear fuel until it can be transferred to dry storage containers for interim storage at the Darlington Waste Management Facility. We account for each and every fuel bundle stored at Darlington.

The Nuclear Waste Management Organization, which was established by the federal government, is developing plans for the long term disposal facility for used fuel. When this comes into service, used fuel will be transferred from the Darlington site to this new facility.

Planning for the eventual decommissioning of Darlington is an ongoing process. The Preliminary Decommissioning Plan is the proposed plan for the eventual decommissioning of Darlington and was prepared in accordance with CNSC and CSA requirements. OPG's financial guarantee ensures that the full costs of future

decommissioning will be covered by investments being made during the operation of the plant.

If you have been to the Darlington site lately you will have noticed the enormous amount of construction activity underway as part of our Campus Plan. The Campus Plan is the master plan that supports the current and future uses of the Darlington station, including the needs of refurbishment.

The following changes to the Darlington site have been completed or are being implemented:

- Refurbishment of the Operations Support Building (OSB) to house my staff.
- Installation of a new Auxiliary Heating Steam Facility to replace our existing aging boiler house and ensure a reliable back-up heating supply in the case of a station shutdown in winter.
- Upgrades to the Site Electrical Power Distribution System support our refurb project and buildings.
- An upgrade to our Water and Sewage Infrastructure and, finally;
- A replacement for our Water Treatment Plant to supply high quality demineralized water to our boilers.

I will now show a short video on our Campus

Plan and then hand the presentation over to Dietmar, who will discuss the refurbishment project.

--- Video presentation / Présentation video

"OPG is making several infrastructure improvements to support the refurbishment of Darlington Nuclear, and 30 more years of operation. These improvements are part of our Campus Plan project.

The Campus Plan project includes infrastructure upgrades around the site in preparation for an additional 30 years of operation to 2055 such as a new maintenance building, new auxiliary boilers, and the expansion and upgrading of the OSB Building.

Additional projects support continued improvements as well as the refurbishment project. These projects include improvements made to the whole road interchange to facilitate workers getting to and from the station, a new vehicle security screening facility as well as upgrades to water and sewer

infrastructure.

Campus Plan projects also include prerequisite work for the refurbishment of Darlington, including construction of the D₂O storage building, the refurbishment project office, retube and feeder replacement support building and electrical power upgrades.

In total, these and other Campus Plan projects will employ approximately 300 engineers, 500 tradespeople and 2,500 building trades jobs for completion.

Completion of the Campus Plan infrastructure projects is another step towards ensuring Darlington will continue to safely and reliably produce electricity for another 30 years."

MR. REINER: Good afternoon. Dietmar Reiner for the record.

As Senior Vice President of Nuclear Projects, I am responsible for the dedicated team --

THE PRESIDENT: You are still not on.

MR. REINER: Let's try that.

Good afternoon. Dietmar Reiner for the record.

As Senior Vice President -- it looks like we have a technical issue here. I'll try one more time.

Dietmar Reiner, for the record. As Senior Vice President of Nuclear Projects, I am responsible for the dedicated team that is planning and executing the refurbishment of the four Darlington units. The province is depending on us to complete the refurbishment safely, with quality and on schedule and on budget.

In this portion of the presentation I will provide an overview of how we plan to do just that, and that's also outlined in our Commission Member Documents. And I'll talk about how the project's timelines would benefit from a 13-year licence.

OPG's nuclear plants use CANDU technology. All CANDU reactors require mid-life refurbishment of their key components after 25 to 30 years of service. Darlington has been operating for more than 20 years now, providing safe, clean and reliable base load electricity for the people of Ontario and it is nearing its mid-life point.

Nuclear refurbishment is a significant undertaking that involves the replacement of major reactor components including pressure tubes, calandria tubes and

feeder pipes. It also involves a tremendous amount of work to be completed in other important areas of the station including the turbine generator sets and fuel handling equipment and on many other systems.

Darlington refurbishment will be an extensive and complex project spanning about 15 years and it will ensure the plant can provide clean, reliable baseload power to the province for another 30 years.

We've been planning the refurbishment since 2007 and are the first utility to be in full compliance with CNSC Regulatory Document RD-360 entitled: "Life Extension of Nuclear Power Plants".

Specifically, we've completed an environmental assessment that concluded there will be no significant adverse environmental effects given mitigation measures that we are implementing; an integrated safety review that demonstrates Darlington substantively conforms to modern codes and standards with no safety significant gaps; a global assessment which confirmed that Darlington is well positioned for safe operation for the next 30 years; an integrated implementation plan which forms the scope and schedule for the regulatory commitments for the refurbishment project.

The integrated implementation plan which is included in the CNSC's Commission Member document for your

approval contains modifications to improve public safety, the five safety improvement opportunities that Brian talked about earlier; environmental assessment mitigation measures and follow-up program activities; reactor component replacement like fuel channels and feeders; actions to address component condition assessments that were performed to determine which components should be replaced; and code compliance activities that were identified from the integrated safety review to bring the Darlington station up to modern codes and standards.

Activities outside the integrated implementation plan include turbine generator upgrades, steam generator cleaning and balance of plant maintenance and repair work.

This slide shows the timeline for refurbishment on the four units. Unit 2 will be the first unit to be shut down for reactor component replacement. This outage will start in October, 2016 and last for approximately three years. The majority of the refurbishment work on this unit will take place during this outage. But before we start Unit 2, we'll be completing work on four of the five safety improvements that Brian had described earlier in his presentation.

The sequence for the other three units is as shown. As you can see in the diagram, the end of

refurbishment occurs in 2028 when we have completed all of the regulatory scope documented in the integrated implementation plan, hence our request for a 13-year licence term to 2028.

As mentioned by Glenn in his opening remarks, we believe a 13-year operating licence is the safest way to manage refurbishment because it would allow all four units to be refurbished under the same set of regulatory requirements. This will enable us to assure nuclear safety through consistency and configuration management between units. We're offering to provide an update to the Commission at public meetings after each unit's refurbishment outage to explain how refurbishment is progressing.

Before I leave this slide, though, it's important to note that the integrated implementation plan work is not limited to refurbishment outages and is already underway. We've already completed the scheduled items for 2014 and will complete all items that are scheduled for 2015 by end of this year. All of the integrated implementation plan work activities will be completed by 2028.

Return to service from each refurbishment outage covers the range of activities from completion of installation work to the reactor achieving a hundred per

cent full power. There will be four regulatory re-start hold points shown in red that are documented in the proposed licence condition handbook.

OPG has established five additional re-start quality checkpoints as shown in this slide. These hold points and quality check points will ensure that all of the necessary steps and requirements have been completed and that we're ready to proceed to the next steps in the start-up process.

As mentioned earlier, we're offering to provide an update to the Commission on our progress after each of the unit's refurbishment outages.

Quality assurance along with safety is a top priority for a project of this scope and duration. As the licensee, we have overall responsibility for protecting workers, the public and the environment. This responsibility is something we take very seriously, whether the work is performed by our employees or by contractors.

The nuclear refurbishment program is designed to provide assurance that all aspects of the work from engineering to construction turnover are conducted in accordance with CSA standard N-286, management system requirements for nuclear facilities, and all other applicable standards.

The majority of work will be completed by

contractors and we've developed a process that ensures they meet the requirements outlined in the CSA standard N-286.

The principal contractors will be allowed to use their own quality program and manage quality to applicable standards. This allows the contractors to use systems they're accustomed to as they supervise the work to achieve cost, the schedule and quality deliverables. They will prepare, monitor and report to us on agreed upon project matrix and implement improvements as required.

We will ensure personnel meet expected behaviours through extensive field supervision; task-specific training; job planning; rehearsals on our mock-up facility, for example; sound work procedures, oversight and the implementation of a continuous improvement program.

Also, our contractors are required to have human performance programs that are equivalent to OPG's.

As Brian mentioned earlier, a lot of work is being done at the Darlington site in preparation for life extension and refurbishment. We anticipate an influx of over 2,000 additional workers and we're making significant investments to ensure these workers can get safely and efficiently to and from their job sites.

Key to this is the new Darlington Energy Complex which houses three functions including a worker on-boarding centre where contract workers will complete

training and qualification to work in a nuclear environment; a mock-up and training facility which provides workers with real life training and rehearsals before critical work tasks begin on a reactor face; and a warehouse for components storage, material staging and pre-assembly.

In addition, we're making other site improvements that include road improvements at the Holt Road and Highway 401 interchange and on Park Road that will allow staff efficient access routes to the site; a new refurbishment project office that provides an efficient and secure entry point for refurbishment workers and parking for about 2,000 vehicles.

The re-tube and feeder replacement island support building provides offices, shops and material staging areas for the staff that will execute and supervise the re-tube and feeder replacement activities and a new vehicle screening facility is helping to expedite traffic through security into the protected area.

These site investments reflect our commitment to safe and efficient worker and material flow.

I'd also like to highlight another investment we've made for safe and efficient work execution, specifically for re-tube and feeder replacement.

Once a unit is safely shut down and all of

the fuel removed, we will drain and dry the calandria and heat transport system. A new storage facility will store the heavy water and will help us manage heavy water for the nuclear fleet.

Removing the fuel channels is next. This is automated and once the fuel channel components are removed, they will be processed at the new re-tube waste processing building. This building is removed from the reactor face to help reduce worker exposure to radiation.

At the re-tube waste processing building, pressure tubes, calandria tubes and other related fuel channel components will be further cut, volume reduced and packed into special containers. The containers will be transferred to the new re-tube waste storage building until they can be moved to a long-term management facility like the deep geological repository.

Other refurbishment low and intermediate level waste, including feeder pipes, will be transferred directly to OPG's western waste management facility, as is the current practice for operational low and intermediate level waste.

Replacing the fuel channels and feeder pipes inside of each of the reactors safely and efficiently is critical to the success of refurbishment. To accomplish this work properly, highly trained workers will use

uniquely designed and carefully calibrated tools. Much of the work will be performed in tight spaces and under challenging conditions.

To address this, we've developed an industry-leading approach to testing tools and training staff ahead of the actual work on the reactor face.

We've built a world class training facility that includes a full-scale reactor mock-up of a Darlington unit. The mock-up accurately represents the size and space constraints within a reactor vault and simulates all physical interferences that could be encountered during the refurbishment and we're already seeing the benefits of this.

Specialized tools have been designed and built. The new tools have been tested and proven to determine the correct time and precise sequence needed to execute each activity in the refurbishment process. This will help establish the detailed schedule for the project, increase productivity and enhance project certainty as well as safety and we will incorporate lessons learned as we move on to subsequent unit refurbishments.

We're extremely proud of this facility. And before I hand the presentation back over to Glenn to wrap up, I'd like to show you a short video to give you a first-hand look at the mock-up.

--- Video presentation / Présentation video

"Ontario Power Generation's state-of-the-art training facility, inside the Darlington Energy Complex, houses a full-scale mock-up of the Darlington reactor.

This is a technologically advanced facility where staff are training for the biggest project that OPG has undertaken.

The reactor mock-up is designed and built in cooperation with our vendors to actually represent the size and space constraints within the Darlington reactor vault and simulate all the structural interferences that will be encountered during the actual retube and feeder replacement work.

Not only the vault, but every door, pipe, hallway, and overhead light has been replicated. This will allow the workers to familiarize themselves with every inch of the reactor vault. They will practice the work, perfect techniques, perform

full dress rehearsals using actual tools, and wearing protective equipment before they begin work inside the station.

Workers, procedures, and tools will be fully tested at the training facility before the execution work begins at the Darlington station. This full-scale mock-up provides workers with the ultimate training tool to hone their skills before entering the units at Darlington.

High-quality training with the right tools in the right environment will help maximize efficiency and minimize costs. This type of upfront investment is a key to our approach to managing the Darlington refurbishment project."

MR. JAGER: Glenn Jager, once again, for the record.

To summarize, I hope this presentation has given you some sense of why Darlington is one of the top-performing nuclear stations in the world. It's been recognized for outstanding performance by some of the most

prestigious organizations in the industry. Its reactors consistently rank among the top-performing CANDU units globally. It's been a leader in the development of innovative maintenance and operational processes like the three-year outage cycle, plus it generates roughly 20 per cent of the electricity annually consumed in Ontario, which is enough power to serve a city of 2 million people. Throughout its lifetime it has produced over 500 terawatt hours of energy, all of it virtually free of emissions contributing to smog and climate change. That is a tremendous amount of power.

Even with this high performance, we have continued to improve and invest in the station. All of this makes the station a great candidate for refurbishment, and one of the province's best-performing and most important infrastructure assets.

We believe that our strong performance, our safety culture, our operating, performance, our continuous improvements in innovation, and finally our community support all make us qualified to continue operations to December 1st, 2028.

We've made provisions for the protection of the environment, the health of workers and the public, and our international obligations.

A 13-year licence will allow OPG to complete

a periodic safety review and a licence renewal with all units completed to the same configuration at the end of refurbishment. A 13-year licence allows us to operate under a consistent licensing basis throughout the project. Operations staff are trained to execute a plan to completion which maximizes safety. The safest place to be is on the plan, not changing the plan midstream.

This is a complex project managing multiple configurations throughout the life of the project, and it's essential that a consistent licensing basis exists throughout this period. A 13-year licence is the best and safest approach.

Thank you.

THE PRESIDENT: Thank you.

I now would like to move to the presentation from CNSC staff as outlined in CMD 15-H8 and H-8.A. I understand that Mr. Howden will make the presentation. Over to you.

***CMD 15-H8/15-H8.A**

Oral presentation by CNSC staff

MR. HOWDEN: Thank you.

Good afternoon, Mr. President and members of the Commission.

My name is Barclay Howden. I'm the director general of the Directorate of Power Reactor Regulation at the CNSC.

With me today are Mr. François Rinfret, director of the Darlington Regulatory Program Division, and Mr. Ross Richardson, senior regulatory program officer of the same division, as well as CNSC inspectors and staff who are available to answer any questions the Commission may have.

This CNSC staff presentation will discuss Ontario Power Generation's application to renew its operating power reactor operating licence for the Darlington Nuclear Generating Station, to authorize refurbishment and continued operations.

We will begin today's presentation by providing an overview of the Darlington station and the licence application, followed by information on the Darlington refurbishment and life extension project. The presentation will then focus on current operations at Darlington, including CNSC staff's regulatory oversight and assessment of OPG's performance. The proposed licence and licence conditions handbook will also be discussed, followed by CNSC staff conclusions and recommendations to the Commission on licence renewal.

I will now pass the presentation over to Mr. François Rinfret, who will provide an overview of the Darlington station and the licence application.

MR. RINFRET: Thank you, Mr. Howden.

Mr. President and members of the Commission, my name is François Rinfret, director of the Darlington Regulatory Program Division.

Darlington station is owned and operated by the licensee, Ontario Power Generation, a Canadian corporation whose head office is in Toronto, Ontario. The station is located on the north shore of Lake Ontario in the Municipality of Clarington and Regional Municipality of Durham in the Province of Ontario.

As you've heard, OPG is proceeding with detailed planning for the mid-life refurbishment of the four Darlington reactors to extend the station life for an additional 30 years.

The Darlington station consists of four 881-megawatt CANDU reactors which came into service between 1990 and 1993. The Darlington site is also home to a tritium removal facility, which is designed to reduce levels of tritium from the heavy water systems at Darlington and other CANDU reactors.

The current Darlington operating licence expires on December 31st, 2015. OPG's licence application

was submitted in December 2013 and an addendum to the application was submitted in January 2015, which focused on station performance data and provided an update since the original licence application was submitted. The licence application requests the Commission renew the operating licence for 13 years to cover life extension activities, including refurbishment of the four Darlington reactors.

As shown on the slide, OPG began feasibility studies for Darlington refurbishment, including commencement of the integrated safety review, back in 2008. Since that time, the CNSC issued an environmental assessment scoping information document, as well as an environmental assessment screening report for the proposed refurbishment and life extension project under the *Canadian Environmental Assessment Act*.

In 2012, a public hearing was held to consider the environmental assessment screening report and the renewal of the operating licence for the period of 22 months. In 2013, the Commission reached a decision on the environmental assessment and concluded that the proposed project is not likely to cause significant adverse environmental effects, taking into account mitigation measures identified by the environmental assessment screening report. The Commission also renewed the operating licence to allow OPG sufficient time to complete

the necessary studies for the proposed refurbishment outages.

With an EA decision reached and the necessary studies for the proposed refurbishment outages complete, the Commission can now consider OPG's licence application under the *Nuclear Safety and Control Act* to authorize refurbishment and continued operations.

I will now pass the presentation over to Mr. Ross Richardson, who will discuss in further detail the regulatory aspects of the Darlington refurbishment and life extension project.

MR. RICHARDSON: Thank you, Mr. Rinfret.

Mr. President, members of the Commission. My name is Ross Richardson. I'm a senior regulatory program officer in the Darlington Regulatory Program Division.

The CNSC's regulatory expectations for proposed projects to refurbish and extend the life of a nuclear power plant are contained in CNSC regulatory document RD-360 "Life Extension of Nuclear Power Plants."

As described in RD-360, once a licensee decides to undertake a life extension project, the licensee systematically identifies and addresses all environmental and safety regulatory aspects and integrates them into an integrated implementation plan. To do this, the licensee:

1, participates in the environmental assessment process; 2, carries out an integrated safety review; and 3, incorporates the results of these assessments into a global assessment report and integrated implementation plan. RD-360 also provides regulatory expectations for refurbishment project execution and returning the reactor back to commercial operation post-refurbishment.

As previously mentioned, an environmental assessment was completed and was subject to a separate public hearing in 2012. Further information on the integrated safety review, global assessment report, and integrated implementation plan are discussed on the following slides.

An integrated safety review, or ISR, involves an assessment of the current plant and plant performance to determine the extent to which the plant conforms to modern codes, standards, and best practices and to identify any factors that would limit safe long-term operation. This enables a determination of reasonable and practical modifications that should be made to the plant or programs to enhance the safety of the facility to a level approaching that of a new nuclear power plant and to allow for safe, long-term operation.

OPG's ISR for Darlington refurbishment and life extension was completed over a three-year period and

submitted to CNSC staff in October 2011. The ISR was carried out in accordance with OPG's ISR basis document, which was submitted to and accepted by CNSC staff as the methodology for performing the ISR.

The ISR addressed all IAEA safety factors and CNSC safety and control areas and demonstrated a high level of compliance with modern codes, standards, and practices. In 2014, OPG submitted an ISR emerging issues review, which addressed ISR basis codes, standards, and practices that were updated since the original ISR assessment. The ISR identified safety improvements to continue to enhance the current strong performance at Darlington over the proposed extended plant life.

CNSC staff conducted an extensive review of the ISR over a two-year period and concluded that the ISR meets CNSC regulatory expectations.

OPG submitted its global assessment report to CNSC staff in December 2013 and made the document publicly available on OPG's external website. The global assessment report presents the results of the environmental assessment and integrated safety review in an integrated manner and provides an overall risk judgment on acceptability of continued operations for the proposed extended plant life. The global assessment report confirms the conclusions of the environmental assessment and

integrated safety review and provides additional detail regarding the positive basis for life extension and continued operations. The global assessment report concludes that the current plant with planned safety improvements including refurbishment will meet to the extent practicable the regulatory design requirements of a new nuclear power plant.

CNSC staff's review concluded that the global assessment report and supporting documents meet CNSC regulatory expectations.

OPG submitted its integrated implementation plan, or IIP, to CNSC staff in December 2013 and made the document publicly available on OPG's external website. The IIP presents proposed environmental and safety improvements resulting from the environmental assessment and integrated safety review and includes time frames for implementation. OPG has incorporated the feedback received from CNSC staff on the IIP, and as a result CNSC staff conclude that the IIP meets regulatory expectations. The IIP is presented in Addendum F of CMD 15-H8.

Some of the major activities identified in the IIP include the replacement of pressure tubes, calandria tubes, feeders, and end fittings; installation of new auxiliary shutdown cooling pumps which are physically separate and of diverse design than the existing shutdown

cooling pumps; installation of a containment filtered venting system to provide filtered emergency venting of containment to ensure containment integrity in the highly unlikely event of a severe beyond-design-basis accident; provision of shield tank overpressure protection to enhance the relief capacity of the shield tank surrounding each unit's calandria vessel to prevent shield tank failure in the highly unlikely event of a severe beyond-design-basis accident; and enhancements to the powerhouse steam venting system to improve reliability, to protect plant systems by venting steam in the unlikely event of a main steam line break in the powerhouse.

Continuing from the previous slide, other major IIP activities include the installation of the third emergency power generator to increase defence and depth of the emergency power reliability if any one emergency power generator is not available; provision of an alternate and independent source of emergency water supply to the heat transport system; implementation of safety-related recommendations from component condition assessments conducted as part of the integrated safety review; and implementation of environmental assessment mitigation and follow-up activities.

In preparation for refurbishment, OPG has established a dedicated refurbishment organization that is

responsible for the planning, implementation, and assurance of the refurbishment project. OPG is using engineer-procure-construct, or EPC, contractors to perform the majority of refurbishment work. OPG is overseeing the activities of the EPC contractors, including review and acceptance of plans and deliverables and surveillance and witnessing of activities.

OPG has informed CNSC staff, as part of initial planning, OPG benchmarked its program with other refurbishment projects including the refurbishments at Bruce Power and Point Lepreau.

As noted previously, in preparation for refurbishment, OPG has constructed a full-scale replica of a Darlington reactor. The replica is being used to train staff prior to performing work in the field and will also be used to develop work plans and test and commission specialized tooling required for refurbishment work.

This slide provides a high-level timeline for life extension activities as proposed by OPG in its licence application. As shown, OPG is planning on staggering the proposed refurbishment outages, with Unit 2 being refurbished first starting in October 2016, following by Unit 3 in 2019, Unit 1 in 2021, and Unit 4 in 2022. The replacement of pressure tubes, calandria tubes, end fittings, and feeders is the primary refurbishment work.

Other IIP actions will be completed either at power or during other planned maintenance outages.

OPG commits to perform the safety improvements with the highest safety benefit as early as possible and no later than the next planned maintenance outage following the unit's refurbishment outage. This plan takes the completion of all IIP activities for all units out to 2028 and forms the basis for OPG's request for a 13-year licence.

The management of refurbishment waste has been safely carried out for previous refurbishment projects, including the refurbishments at Bruce Power and Point Lepreau. OPG has considered the lessons learned from these projects to the management of refurbishment waste for Darlington. For example, volume reduction activities will be performed outside of the reactor vault and a dedicated team will take ownership of the waste management program.

During refurbishment, retube waste will be removed from the reactors, placed in shielded flasks, and transferred to a new dedicated retube waste processing building located on site within the protected area. The waste will then be segregated, volume-reduced, and packaged into shielded containers. The containers will then be transferred and stored at a new dedicated retube waste storage building located on OPG property, adjacent to the

Darlington waste management facility. The retube waste storage building is licensed separately under the waste facility operating licence.

Return to service involves returning the reactor back to commercial operation post-refurbishment, and includes demonstrating that the associated work meets specified requirements and management arrangements have been updated appropriately.

Similar to the Bruce Power and Point Lepreau refurbishment, CNSC staff have identified regularly hold points for the return to service of each unit undergoing refurbishment, as noted on this slide. These hold points would serve as regulatory verification to ensure prerequisite commitments had been met for staged increases in reactor power. Prerequisite commitments for each regulatory hold point are included in the draft licence conditions handbook.

CNSC staff are recommending that approval to remove regulatory hold points be delegated to the executive vice-president and chief regulatory operations officer. For reference, similar delegation of authority was previously granted for the Bruce Power and Point Lepreau refurbishment projects.

I will now turn our attention to CNSC staff's performance assessment of the current operations of the Darlington station.

The CNSC has a clear and robust regulatory framework in place to ensure the continued safe operation of a nuclear facility. Regulatory oversight is provided to ensure licensee's operate the nuclear facility in a safe manner in compliance with the requirements of the *Nuclear Safety and Control Act* and its regulations, as well as the Commission-approved licence conditions. Regular inspections and evaluations verify that licensees are complying with the laws and regulations as well as the conditions of their licence. In this way the CNSC can ensure licensees are operating safely and adhering to regulatory requirements.

Licensees are required to notify the CNSC of situations of high safety significance and submit routine scheduled reports on a quarterly basis or annual basis to the CNSC on various topics. CNSC staff report annually to the Commission on the licensee's performance in the regulatory oversight report for Canadian nuclear power plants. The 2014 report will be presented to the Commission at tomorrow's Commission meeting.

As shown on this slide, compliance activities conducted by CNSC staff include inspections,

event reviews, and other compliance activities such as station walkdowns and desktop reviews of OPG-submitted documents and reports. These activities represent over 23,000 person-days of effort by CNSC staff over seven years from 2008 to 2014.

CNSC staff conclude that for the vast majority of these inspections there are no significant findings and OPG continues to be in compliance with CNSC regulatory requirements. As required during the course of compliance activities, CNSC staff raise action items to track the resolution of issues. OPG has responded to the satisfaction of CNSC staff on all issues raised.

This slide presents CNSC's plant safety performance ratings for the Darlington station from 2008 to 2014. As shown, Darlington has received a fully satisfactory integrated plant rating, the highest rating possible, each year for the past seven years.

In summary, safety performance at Darlington has remained satisfactory or fully satisfactory in all safety and control areas. As mentioned, Darlington has received a fully-satisfactory integrated plant rating each year for the past seven years. No worker or member of the public received a dose in excess of regulatory dose limits and all radiological releases were well below regulatory limits. OPG's programs are implemented and maintained

effectively in accordance with regulatory requirements.

Operating performance has been fully satisfactory over the past seven years and OPG continues to make safety enhancements and improvements to the station.

In summary, OPG continues to make adequate provision for the protection of the environment, workers and the public.

As shown here, CNSC staff have identified regulatory focus areas that may be of particular interest to stakeholders, the public, and the Commission regards to this Darlington licence renewal. These regulatory focus areas are described in more detail on the following slides.

Probabilistic Safety Assessments, or PSAs, are one of the various methods used to improve the robustness of plant designs, safe operation, and to demonstrate that multiple defence provisions are in place.

PSA is used in a complementary manner to the traditional deterministic safety analysis and defence in-depth considerations.

In 2011 OPG submitted a detailed and comprehensive Probabilistic Safety Assessment for Darlington. CNSC Staff completed an in-depth review of the PSA and confirmed that the submitted PSA followed the accepted methodologies and that Darlington is compliant with CNSC regulatory requirements.

In 2015 OPG submitted an updated PSA which includes recent design modifications, station operating experience, and feedback from CNSC Staff's review of the 2011 PSA.

The updated PSA includes credit for emergency mitigating equipment and the safety improvement opportunities committed to as part of the environmental assessment. The PSA results show that safety goal limits are met for each hazard and for the aggregation of all hazards by simple addition.

OPG has committed to develop a whole-site PSA pilot for the Pickering Nuclear Generating Station, and the lessons learned from the pilot will be considered for Darlington.

With regards to fitness for service of pressure tubes, the current Darlington operating licence requires Commission approval to operate beyond 210,000 equivalent full-power hours, or EFPH, which was a design assumption of the pressure tubes service life at the time of construction.

This slide shows the projected EFPH values at planned refurbishment outages for each Darlington unit. As shown, Units 2 and 3 will be refurbished prior to reaching 210,000 EFPH while Units 1 and 4 are expected to exceed this limit prior to their planned refurbishment

outage.

To demonstrate margin on the projected EFPH values at scheduled refurbishment outages, the pressure tube service life for Darlington is planned for 235,000 EFPH. CNSC Staff have verified that OPG has established programs in place to monitor the fitness for service of pressure tubes to support the continued safe operation for the pre-refurbishment service life to 235,000 EFPH.

Operating beyond this point is not a cliff-edge effect, but is an indicator of when further assessment will be necessary. And given OPG's plans to refurbish the Darlington reactors, further assessments to demonstrate operating beyond this point is not required.

In the meantime, pressure tubes are continually monitored and continue fitness for service must be demonstrated.

CNSC Staff recommend that the Commission authorize OPG to operate the Darlington units up to 235,000 equivalent full-power hours.

With regards to nuclear emergency management, OPG has enhanced its emergency response capabilities to respond to a highly unlikely event, a highly unlikely severe beyond-design-basis event.

Emergency mitigating equipment has been procured and stored outside the protected area for use in

case of a severe accident. Public alerting sirens are installed and tested around the site.

Exercise Unified Response conducted in 2014 demonstrated a number of best practices and identified opportunities for improvement, which are being incorporated in current plans, procedures, and training.

OPG is working with stakeholders to pre-distribute potassium iodide tablets to all the residents, businesses, and institutions within 10 km of the Darlington site and pre-stock potassium iodide tablets out to the 50-km radius by the end of 2015.

OPG is working towards full implementation of the recently issued -- the recently published CNSC REGDOC-2.10.1 on Nuclear Emergency Preparedness by 2018.

with regards to nuclear waste management, all low and intermediate-level waste from Darlington is safely transported to the Western Waste Management Facility for storage. Some of the low-level waste may undergo processing, either through compaction or incineration prior to storage.

Used nuclear fuel is first stored in the irradiated fuel bays at Darlington. After a cooling period of at least 10 years, the used fuel is then transferred to dry storage containers and moved to dedicated buildings at the Darlington Waste Management Facility located next to

the station.

The Darlington Waste Management Facility is licensed separately under a CNSC waste facility operating licence.

OPG has implemented waste reduction and diversion programs at Darlington. Waste generated in nuclear areas, but that is likely not contaminated, is segregated and later surveyed. If the waste is found to be clean or nonradioactive, the material can be unconditionally released for conventional disposal or recycling.

CNSC Staff verify OPG's waste management programs as part of their regular oversight of the Darlington station.

With respect to the Fukushima action items or FAIs, OPG is the first nuclear power plant licensee to have closed all FAIs. Emergency mitigating equipment or EME, including portable diesel pumps and diesel generator and portable uninterruptable power supplies, are available to supply essential fuel cooling through multiple pass and to supply key monitoring equipment in the highly unlikely event of a severe beyond-design-basis accident.

Further enhancements are being made to streamline and simplify EME deployment and provide additional capacity to repower key station equipment.

Hydrogen mitigating passive autocatalytic recombiners, or PARs, have been installed on all units and emergency preparedness plans, procedures, training, and drills have been enhanced to include severe beyond-design-basis events.

CNSC Staff are satisfied that OPG has strength in reactor defence in-depth and enhanced its emergency response capabilities in response to the Fukushima event.

With regards to the environment, the environmental assessment for the proposed refurbishment and continued operations of the Darlington station concluded that the proposed project is not likely to cause significant adverse environmental effects taking into account mitigation measures identified in the EA screening report.

OPG has since developed an EA follow-up program in consultation with CNSC Staff, Fisheries & Oceans Canada, and Environment Canada to ensure that it provides adequate controls for the protection of the environment and the public. EA mitigation and follow-up activities are included as commitments in the integrated implementation plan.

In addition, CNSC licensing requirements have been updated to include the CSA Standards and CSA

REGDOC pertaining to environmental protection, as noted on this slide.

And for this specific licensing action, an environmental assessment under the *Nuclear Safety and Control Act* was carried out by CNSC Staff and appended to CMD 15-H8. The report concludes that OPG continues to make adequate provision for the protection of the environment and the health of persons.

In 2014 CNSC Staff carried out an independent environmental monitoring program around the Darlington station. The results confirm that that the public and the environment around the Darlington station are protected. These results are consistent with the results submitted by OPG confirming that OPG's environmental protection program protects the health and safety of people and the environment.

CNSC Staff have also considered other matters of regulatory interest. Early in the review process First Nations and Métis groups who may have an interest in the Darlington licence renewal were identified, provided information about the process, encouraged to participate in the Commission's public hearing, and to apply for funding through the CNSC's participant funding program.

Since the EA refurbishment hearings in 2012

CNSC Staff have met with identified groups upon request to discuss OPG's licence application and the life extension process.

CNSC Staff will continue to actively communicate and build relationships with First Nation and Métis groups who expressed an interest in the Darlington station.

Participant funding was made available to assist members of the public, Aboriginal groups, and other stakeholders to participate in the CNSC's regulatory process for this Darlington licence renewal. A total of approximately \$73,000 was awarded to eight applicants.

In terms of cost recovery and financial guarantees, OPG is in compliance with the CNSC cost recovery regulations and have satisfactory financial guarantees in place for decommissioning.

OPG has a well-established public information program that meets CNSC requirements. Relevant information on the Darlington activities are being effectively communicated to the public and CNSC Staff have identified a number of best practices such as public tours of the new Darlington Energy Complex.

And finally, OPG continues to fulfill its obligations for nuclear liability insurance.

Continuing with other regulatory matters, in

June of 2015 Fisheries & Oceans Canada issued a section 35(2) *Fisheries Act* authorization to OPG for the operation of the Darlington station arising from the continual intake of cooling water and the impingement and entrainment of fish from Lake Ontario.

The authorization includes conditions to be complied with in relation to mitigation and offsetting measures and standards, monitoring and reporting. The authorization is not linked to this CNSC licence application and, therefore, it does not impact or impede the decision for this licence application.

CNSC Staff are satisfied with the operation of the tritium removal facility located at the Darlington site. OPG is in the process of reviewing various options to extend the operating life of the tritium removal facility and expects to make a decision in 2017. Life extension of the tritium removal facility is being addressed separately from the Darlington refurbishment project.

CNSC Staff have completed all actions requested by the Commission as part of the 2013 decisions for the Darlington refurbishment and continued operations environmental assessment and 22-month licence renewal.

One such action was to update the Commission on the assessment and health and environmental consequences

of severe accident scenarios at the Darlington site. CNSC Staff completed a study entitled Study of Consequences of a Hypothetical Severe Nuclear Accident and Effectiveness of Mitigation Measures, the details of which were presented to the Commission in June 2014 and March 2015. And the final report will be published to the CNSC website in September 2015.

I will now turn our attention to the proposed licence and licence condition handbook.

As noted on this slide, CNSC Staff are recommending a 10-year licence to align with the recommended frequency for the conduct of periodic safety reviews as outlined in REGDOC-2.3.3 entitled Periodic Safety Reviews. The ISR performed by OPG in accordance with RD-360 is considered to be equivalent to the first PSR.

The proposed licence includes standard licence conditions that make reference to licensee programs. Specific CNSC regulatory documents and CSA Standards have been moved from the licence to the licence conditions handbook.

In addition to the standard licence conditions for the 14 CNSC safety and control areas, the proposed licence includes four new licence conditions, as noted on this slide: One, the conduct of a periodic safety

review in support of OPG's next licence application; two, implementation of a return-to-service plan for refurbishment; three, completion of the IIP activities; and four, obtaining CNSC approval prior to the removal of regulatory hold points for the return-to-service of refurbished reactors.

The Darlington licence condition handbook, or LCH, provides compliance verification criteria used to verify compliance with the conditions in the licence and also includes non-mandatory recommendations and guidance on enhancing the effectiveness of the safety and control measures.

As shown on this slide, there are nine updated CNSC regulatory documents that are being proposed as updated requirements for the next licensing period. The implementation dates listed have been accepted by CNSC Staff.

As you can see from the table, many of the updated regulatory documents will be fully implemented by OPG when the proposed licence and licence conditions handbook come into effect on January 1, 2016.

In addition to the CNSC regulatory documents, there are 11 updated CSA Standards being proposed for inclusion in the licence conditions handbook. And again, the implementation dates listed here have been

accepted by CNSC Staff.

As you can see from the table, many of the updated CSA Standards will be fully implemented by OPG when the proposed licence and LCH come into effect on January 1st, 2016.

I will now pass the presentation over to Mr. Barclay Howden for CNSC Staff's overall conclusions and recommendations.

MR. HOWDEN: Thank you, Mr. Richardson.

Based on the assessment of OPG's safety performance at Darlington, CNSC Staff conclude that as per section 24(4) of the *Nuclear Safety Control Act* that OPG is qualified to carryout the activities authorized by the licence, and in carrying out the licence activities OPG has made and will continue to make adequate provision for the protection of the environment, the health and safety of persons, and the maintenance of national security, and measures required to implement international obligations to which Canada has agreed.

CNSC Staff recommend that the Commission accept CNSC Staff's conclusions and recommendations presented in the CMD 15-H8 and exercise its authorities under the *Nuclear Safety and Control Act* to renew their licence to authorize OPG to refurbish and continue to operate the Darlington Nuclear Generating Station from

January 1, 2016 to December 31, 2025.

CNSC Staff also recommend that the Commission authorize the delegation of authority, as indicated in two proposed licence conditions, including the removal of regulatory hold points.

Finally, CNSC Staff recommend that the Commission authorize OPG to operate the Darlington Nuclear Generating Station beyond 210,000 equivalent full-power hours up to the proposed refurbishment outages to a maximum of 235,000 equivalent full-power hours.

Thank you, Mr. President and Members of the Commission, we are prepared to respond to any questions you may have.

THE PRESIDENT: Thank you.

I think this is a good time to take a short break. We will take a 10-minute break, be 1540, according to this clock.

--- Upon recessing at 3:30 p.m. /

Suspension à 15 h 30

--- Upon resuming at 3:43 p.m. /

Reprise à 15 h 43

THE PRESIDENT: So I now would now like to open the floor to questions from Commission Members and to

OPG and CNSC staff. I would like to start with Dr. McDill.

MEMBER MCDILL: Thank you.

I would like to begin with a very broad question -- it's probably actually a series of questions -- relating to the simultaneous operation of a refurbishment and an operating side, reactor operating side.

I understand there will be a separate refurbishment organization but I haven't seen an org chart that shows how that organization fits into the big picture and I'm almost certain that an intervenor will request that for day 2, so I will put that in. I think it would be good to see how that refurbishment organization fits in. Do you have one here? No, okay. So that's my first --

Staff, have you seen such an org chart? You've seen it? It exists?

MR. RINFRET: François Rinfret, for the record.

We have seen org charts of the various groups within OPG.

MEMBER MCDILL: But nothing that shows how the refurbishment organization fits into the -- maybe I will pass that back to --

MR. RINFRET: You are correct.

MR. REINER: Dietmar Reiner for the record. We don't have an organization chart with us

but we will have one for day 2. But if you would like, I can describe at a high level how we are structured.

MEMBER MCDILL: Please.

MR. REINER: There are two separate organizations. The organization in refurbishment currently is resourced to support the planning activities and we are just now preparing to enter the execution phase of the project and so there is a bit of a transition.

Now, the refurbishment organization has a dedicated engineering function. The engineering function aligns with fleet engineering. So same standard, same engineering change control process that is used in the fleet is applied in refurbishment.

There is also a dedicated operations and maintenance function that is looking at things like permits that need to be prepared, assessments, field assessments that need to be conducted to get ready for execution as well as integrating all of the non-refurbishment related work. For example, we do need to maintain systems and execute the work that would normally get executed during a cyclical outage, so that's done through the operations and maintenance organization.

There is a tight integration back to Brian's organization. So there is a single authority, operating authority under Brian.

Then there is a project management function where we have project managers accountable for specific work packages or project bundles as we call them. The re-tube and feeder replacement is one such bundle. We have five bundles. And that organization includes a project office, field engineering capability, construction support.

Then to support all of this we have a planning and controls function that's used to report up on our performance and also a contract management function given that we are executing a large portion of the work through an engineer/procure/construct contract arrangement.

So that at a high level describes what the organization looks like, but we will have that with us for day 2.

MEMBER MCDILL: Thank you.

My second question is again fairly general and I think I will ask staff to try this one first.

What, if anything, differs in the application of the LCH on the refurbishment side versus the operating side? Without fuel, obviously you can't have a major process failure for example.

MR. HOWDEN: That is correct. I will ask François Rinfret to give you a reply.

I just wanted to touch one from your -- when you opened up before you talked about simultaneous

operating and refurbishment. So Bruce Power was in that situation where it had an operating station and units undergoing refurbishment, so that's not new.

The important thing is to make sure that the licensee -- make sure that their nuclear management system functions properly and our review of what they have been doing is they have taken the lessons learned from Point Lepreau, Bruce and some of the international and integrated that into the way they want to structure and organize their organization.

In terms of how we deal with the LCH, which deals with all four units, when you have some units operating, some undergoing refurbishment and in the future you are going to have some post-refurbishment operating units with some pre-refurbishment ones, so I will ask Monsieur Rinfret to respond to that.

MR. RINFRET: François Rinfret.

Obviously there needs to be a separation, a physical set of boundaries between units being refurbished and the rest of the units that are operating. So the licensee is providing this separation and describing how it fits in order to maintain the essential services and the essential common systems operating for the operating fleet versus the ones that have been ready to -- under refurbishment to the contract and the refurbishment

operations themselves. So that's one aspect of it.

Another aspect of separation is ensuring that the training continues with the various workgroups so that there will be groups of operators working on the operating units versus those that also need to be trained and ready to do these other operations. There is a whole area of discussion under training.

In terms of rules of operation, there are definitely some differences in the actual operating policies and principles that are applied to a refurbished unit versus one that is in operation. That is also being looked after by having a complete stream of rules that apply for a unit which is down basically versus one that is operating.

I'm not sure I have answered your full question, so perhaps you would like to --

MEMBER MCDILL: Thank you.

I'm going to another question, so I'm starting -- I just want to get the --

MR. RINFRET: Okay.

MEMBER MCDILL: -- make sure I understand. Did OPG want to add anything to that?

MR. DUNCAN: Brian Duncan for the record.

You know, fundamentally, once we take a unit out for refurbishment, initially we will go through the

defuel of the core, then we will move on to isolating containment from the rest of the station's containment, and ultimately we will dewater both the moderator and heat transport systems. So absolutely, some of the rules that would apply for an operating unit won't really make sense or won't really be applicable to a unit that's in refurbishment.

And the key for us in the work that Dietmar is doing is making sure that those milestones are well understood, they are well laid out in advance so that we stay in sync, if you will, both as we take the unit in stages out of service and then as we bring that unit back in in stages as well.

MEMBER McDILL: Yes?

MR. JAMMAL: It's Ramzi Jammal, for the record.

Dr. McDill, you are asking a very valid question with respect to regulatory oversight. Nothing is going to take place until the Commission approves the IIP. Once the IIP is approved by the Commission, which becomes the basis for the refurbishment in the LCH itself and from our compliance of verification criteria, we will continue the oversight with respect -- actually focus oversight on the IIP itself and we measure the progress in the refurbishment against the IIP as been approved by the

Commission.

On the day-to-day operation, the current LCH OP&P that is being applied for the existing operating reactors will continue in that chapter of the LCH from a (indiscernible) chapter. So that's why in the LCH you don't see a separate focus until the Commission approves the IIP. Hence, it becomes literally the regulatory contract that OPG must comply with and carry out its refurbishment.

So until such time as the Commission approves the IIP, it still is in draft form and once it is approved by the Commission it becomes the regulatory requirement that OPG must implement.

THE PRESIDENT: But in practical terms, okay, you have inspectors on site. Is it going to be a different type of people looking at the IIP, or the refurbishment process, and the operational process?

MR. HOWDEN: Barclay Howden speaking.

So we are going to follow the same model that we did before with other refurbishments where the lead is from the lead RPD. In this case it will be Darlington with the support of our specialists in Ottawa but our onsite inspectors will be leading inspections. But some of the focus of the inspections will be different. In terms of a unit undergoing refurbishment, the inspections will be

against the requirements under the IIP in terms of putting in place.

But you have to remember, basic safety and programmatic functions still have to be in place, like radiation protection, environmental protection, training of personnel and certification. So that won't change but the activities being carried out by the licensee in a refurbished unit are obviously different and so we will be focusing on those to make sure that they are done in a safe manner.

THE PRESIDENT: What we do now is we go --

MEMBER MCDILL: I have a few more directly related to this.

THE PRESIDENT: Okay.

MEMBER MCDILL: This is -- I wanted to get the picture so I could -- so I'm going to ask a hypothetical question and since the Chairman is glaring at me I will try and make it a multistep one and I will come back.

But suppose there is a small noncompliance on the refurbishment side, a hypothetical -- I'm saying small, I don't know, maybe someone is wearing the wrong booties, they are green instead of blue or whatever -- which health physics group is responsible, the refurbishment side or the operating side?

What lab receives the sample? Is there a lab on the refurbishment side and a lab on the operating side?

What is the role of the inspector, the CNSC inspector, in a situation like this?

I'm not talking about a major release, I'm just talking about some kind of noncompliance. How does it make its way through the system and would it be handled any differently? So I guess the question is would it be handled any differently if it came on the refurbishment side than on the operating side? That's a lot of questions.

MR. HOWDEN: So I think you asked three questions.

MEMBER MCDILL: Yes.

MR. HOWDEN: I think the first one should be answered by OPG --

MEMBER MCDILL: Sure.

MR. HOWDEN: -- which organization is going to deal with it.

MEMBER MCDILL: Yes.

MR. HOWDEN: The second question is what is the inspector going to do with it in terms of driving it through our regulatory system.

MEMBER MCDILL: Yes.

MR. HOWDEN: So after they are done, François Rinfret will respond to that.

MR. DUNCAN: Thank you. Brian Duncan for the record.

So, in a nutshell, there is not going to be a separate lab. My lab, though, will be beefed up with additional people and additional resources, equipment, machinery if needed, to manage, if you will, the additional workload. So if there is a small noncompliance, as you suggest, it's the same organization that's going to be accountable for ensuring the standards are met. They may very well have -- well, they will have additional staff to help oversee that project or help detect it in the first place, help respond, help coach and provide feedback, but as far as we are concerned, it is still going to be one organization.

Dietmar and I will work very closely together to make sure that there is no drift of standards between our groups. In fact, people in my house will be moving in and out of refurbishment as sort of the work ebbs and flows to provide augmented staff or provide backfill for support or whatever the needs are of the day.

MR. RINFRET: François Rinfret representing the Darlington Regulatory Program.

I would say that there is no such thing as a

small noncompliance. All noncompliances are treated the same by our inspectors. So that's one thing we needed to clear up. We do have -- the inspectors in CNSC have a compliance follow-up process and an enforcement process that they apply vigorously to whatever findings are made, whatever facts are determined through their normal activities.

Regarding the reporting system, it remains the same at the licensees. They have indicated they are going to process anything that falls out of the ordinary on the day of refurbishment. Therefore, inspectors in the field are also looking over the shoulders of licensees and the various documentations and events and databases that are available to them.

So no such thing as letting go. It's about seeing this to closure, whatever level that there is.

We have built a regulatory oversight plan to adapt to the Darlington strategies and this oversight plan basically builds on our current oversight activities that we do, day-to-day monitoring including inspections of various shapes and forms and reviews of documentation and assessment of whatever the licensee is to give the CNSC staff in return.

So that process has been built from experience through the last two major refurbishment

activities, namely New Brunswick Power and Bruce Power, Bruce Power being another one of those multi-unit refurbishment capacity.

There is also a current method to increase resources as are necessary and depending on the risk and the actual activities to be performed. So that remains available at the level of the site office as well.

MEMBER MCDILL: Thank you, Mr. Chair. I will skip my next round if I need to.

THE PRESIDENT: No, no, no. We are going to do as many rounds of one question each as we need.

--- Laughter / Rires

THE PRESIDENT: Because I would like to go around. So, Ms Velshi, you're next.

MEMBER VELSHI: So mine too is an omni-question. I want to explore the refurbishment timeline and especially as it relates to your licensing term that you have requested.

So if we can turn to page 11 of the OPG written submission, Figure 1-3 on the timeline, I have a few questions on that.

So the first one is that all four units' refurbishment schedule seems to be about the same duration and I just wondered, is that what one would expect? Wouldn't you expect the first unit to take a bit longer and

then you have learned from that and the others get a bit shorter?

MR. DUNCAN: Brian Duncan, for the record.

It's a very simplified diagram, that's true, and we show them as roughly equal length. We absolutely have -- and I will let Dietmar speak to more detail to it here -- we absolutely have an expectation that as we learn lessons from the first and we have an expectation with our contract partners as well that their performance will improve and that we should see better results as we go through those refurbishments. We should see more efficiency, for example, and we should see better productivity in some of the core work programs. But I will let Dietmar add some more info.

MR. REINER: Thank you, Brian. Dietmar Reiner for the record.

So one of the things that has us initially starting with four units that are essentially of equal duration, we expect actually through the mockup and the training that we are doing to achieve productivity and performance on the mockup before getting into the field. We expect to get optimum productivity very early on.

So what you would expect to see without that kind of a training facility, these productivity improvements probably aren't as substantial. We will

likely see some of that. There will likely also be opportunities to maybe change the sequences a little bit in how the refurbishment is executed.

As Brian said, we would incorporate lessons learned and look at that and then apply it and adjust the schedule accordingly, but at this stage we are nominally looking at a 36-month outage for each unit.

MEMBER VELSHI: Thank you.

My second one -- again, they are all tied to this particular slide -- is that you actually have three units being worked on at the same time, two undergoing refurbishment and one just a regular outage, and I just wondered, what level of complexity does that bring, having three units with people working on those at the same time doing different kinds of work and the strain that it would put on the organization?

MR. DUNCAN: Okay. Brian Duncan for the record.

Again, Dietmar will likely have some additional details, Commissioner, but you know, the first unit -- as you can tell, Unit 2, the first unit up for refurbishment, is done on its own and that's where the majority of those lessons learned will come.

As we get into the subsequent refurbs, although you can't see it here, the way that the work

programs are laid out, where the overlap will be will be different from unit to unit. So absolutely, it will take more staff overall. But, for example, as we are re-tubing Unit 3, that work, the initial phase will be done before they would move on to that same type of work in the next unit, then line Unit 1.

So you will see in total there will be more staff involved and obviously more oversight, and a lot of our plans are all about being able to do that and being able to do that with margin. But the way we laid out the schedule ensures that we are not -- we are never going to choke one outage for a specific talent set or a specific tooling set. It's all sequence so that it should line up neatly and different skill sets and different people move from one to the other in sequence.

Dietmar, anything else?

MR. REINER: There was maybe just a little bit of history on how we got to this. Initially we had actually looked at overlaps of all four units and there was a decision made about a year or two ago where we unlapped the first units just to be able to finish one end-to-end and incorporate the lessons learned.

But it really is -- as Brian said, the re-tube and feeder replacement job is the critical path job in the refurbishment. Everything else is executed in work

windows underneath. We have adopted a model whereby we are not loading the available work windows to more than 60 percent of the available timeline. So that gives us an opportunity to deal with critical path being executed more quickly than expected or if we encounter some unforeseen issues.

That sequence of overlaps really, as Brian had identified, a sequence of work that would get finished on Unit 3, for example, would then move to Unit 1. So the way it is laid out, you wouldn't actually be using the same resources to do the same things simultaneously.

MEMBER VELSHI: I don't know if there has been a refurbishment project that has been brought in on schedule and your duration of the licence -- your licence term is tied in very much -- your request for a licence term is tied in very much with this schedule. So if you can share with us how much contingency is in here and what is your confidence level given what you know today that you would meet that 13-year window that you have asked for?

MR. REINER: Dietmar Reiner for the record.

Our confidence in achieving a 13-year window that we have is quite high. We are -- so underneath what you see here in the boundaries -- and the same goes for you had mentioned that refurbishment hasn't been brought in on budget either -- we are looking at all of the detailed

scope that will get executed.

We have actually just recently achieved an engineering milestone. So all of the design engineering changes that we expect to execute on the first unit are now essentially complete. We have a very good view of the scope and are now in the process of putting the construction work packages in place to lay this out. So our confidence in being able to achieve the schedule is actually quite high.

We are now just in process of finishing the planning phase and moving to execution. We are taking forward a final release quality budget and estimate to our Board of Directors in the end of September and beginning of October. That's where we will identify exact contingencies that we have available. At this stage we still feel comfortable there is sufficient contingency to allow us to execute this successfully.

MEMBER VELSHI: And we have just heard this publicly, or I have in the media, that the province has said they would not give the green light for the second unit until they have seen the success of the first unit and these approvals may not happen soon enough. Again, you have your second unit coming down for refurbishment as soon as the first one is there.

So again, it's just a caution here or

concern on our part on have those contingencies been built in.

And the next question -- so that wasn't a question, it was more a statement. The next question really is for staff around the PSR.

We have seen in staff's presentation that OPG says they are going to be compliant with the new REGDOC come January of next year. The first ISR was submitted in 2011, so I guess we expect the next one in 2021 and this doesn't show it happening until 2028. So how do I reconcile the two as to when is it expected?

MR. HOWDEN: Barclay Howden.

I think the challenge with that is as the units are refurbished they are considered not new but close to new and then the clock starts on that. I think the thing is that because of the questions that you are posing right now, based on the information we have is that we are sticking to our view that there should be a 10-year licence term with PSR starting around the seven-year period. That may have to be adjusted as we go along.

But you saw what our arguments are for maintaining the 10-year licence term and I just want to throw a couple of pieces of information toward you, is that you will recall when we presented the PSR document there was a lot of discussion about the licence period and the

position we take is we would be moving from five years to 10 years, which we call evolutionary as opposed to revolutionary. But we also pointed out that the public's desire to participate in public proceedings where the Commission actually takes regulatory decisions was another part of us recommending the 10 years. So that's why we have gone to the 10-year period with the PSR there.

Regardless, we can say that regardless of the licence term that we maintain continuous regulatory oversight of the plant and we will be back to report to you on a yearly basis. We are here almost monthly with the status report on power reactors and event initial reports, so you will always be up-to-date.

But I would like to add one other point, because in OPG's presentation they talked about they wanted sort of the regulatory requirements to remain steady over the course of their licence term and that's part of their motivation for requesting 13 years. From our view, when an ISR is done that leads to refurbishment, the ISR has done this comparison against modern codes, standards and practices, and in our view this won't change over the course of the refurbishment regardless of what the licence term is.

Where things could change over a licence term is where OPEX comes out and generally this occurs on

programmatic type issues as opposed to design issues and an example that I would give to you is cyber security. So the licensees have put in cyber security, we have codified our requirements. But you know this is a really moving sector right now, is cyber security. So if something changed over the licence period that we deemed was important enough, we would expect that they would have to implement programmatic changes to do that.

MEMBER VELSHI: So from your perspective, this requirement from OPG to have consistent requirements laid out right up front, whether it is 10 years or 13 years, doesn't change is what you are saying?

MR. HOWDEN: That is correct from the aspect of refurbishment because they have done all the work based on those set of standards and you really can't change those in the middle unless something happened that it got really stretched out and you say, okay, some of these code effective dates are really, really old, do we have to revisit it. But based on their plan here, we see no changes to that over the course of a refurbishment period of 13 years.

MEMBER VELSHI: And when do you expect them to submit the next PSR -- or their first PSR?

MR. HOWDEN: So at this point we would still expect it to be -- they would start working on it around --

yes, 25 minus 3 they would start working, so 2022, with the expectation that it would come in just prior to licence renewal so that it could be considered by the Commission because there will be an IIP at that time.

THE PRESIDENT: Everybody keeps talking about this project with such certainty, et cetera. Forgive my ignorance here. What has the Government of Ontario approved to date with respect to the refurbishment? I didn't hear any public statement that Darlington will be refurbished, nor the four of them will be refurbished. All I hear is cocktail rumours about we will allow you only one and then we will decide what next. Am I wrong about this? You guys are spending a lot of money, a lot of resources as if this is a done deal. Is it a done deal?

MR. REINER: Dietmar Reiner for the record.

At this stage what is approved is the definition or planning phase work that takes us to the end of 2015. A requirement as part of that definition phase is for us to develop the final execution budget and schedule. That will then get presented to our Board of Directors.

Our current plan is to present that at the end of September and early October and seek Board approval and from there we would take it to our shareholder and seek shareholder approval on that budget and schedule. So that is the timeline that we are working on. At this stage we

do not yet have approval from our Board to enter the execution phase of the project.

THE PRESIDENT: So presumably all of this is -- then you will get this authority prior and then all of this is subject to a licence from us?

MR. REINER: That's correct.

THE PRESIDENT: Okay.

Monsieur Harvey?

MEMBRE HARVEY : Merci, Monsieur le Président.

On page 27 of your presentation, it's about nuclear waste and safeguards, you mention future generations will not be unduly burdened, future decommissioning costs fully covered. My concern is where will the money be? We have different scenarios for repository for the fuel and for the waste. There will be different costs to transport.

Well, let's say to what extent are those different scenarios taken into consideration when establishing the cost of decommissioning? And supposing you have a repository or you don't have a repository, who will pay, if not a repository? Even if a repository will pay, we have OPG, Hydro-Québec and the other ones, but where will the money be? How can we be sure that the future generations will not be burdened?

MR. HOWDEN: So Barclay Howden speaking.

From a regulatory perspective on that oversight, I would like to ask Karine Glenn, who is the Director of Wastes and Decommissioning Division, to provide you the information that we have in terms of reviewing of decommissioning plans, financial guarantees regarding those, as well as the potential disposal of fuel in the future that is being governed by the *Nuclear Fuel Waste Act*.

MS GLENN: Karine Glenn for the record.

So let me begin by saying that as part of our requirements the CNSC requires OPG to review and revise and resubmit their financial guarantees and their PDP every five years. So if there is no significant change to their PDP, then they still need to reevaluate their financial guarantees and resubmit it to us.

If there is major significant changes in their activities or facilities, then they would need to revisit both the PDP and the financial guarantee regardless of whether or not they were at that five-year time period.

In addition to that, we require OPG to annually update us on the state of their financial guarantee, so the amount of what it's at.

So currently, the financial guarantee that was accepted in 2012 by the Commission is sufficient to

cover the decommissioning of all the OPG-owned nuclear facilities, so including the nuclear generating stations and the current waste facilities. It also includes the amount that is part of -- that is set aside for the nuclear waste management organization for the disposal of the used nuclear fuel.

So that is currently the strategy that is being looked at for the disposal facility of the used nuclear fuel and that amount is -- as you mentioned, there is no currently final solution, they are in the siting stage. That process is not complete and they haven't come to us with an application yet. But that gets evaluated also on an ongoing basis and that funding is provided through the *Nuclear Fuel Waste Act*.

If OPG wants to add anything to that...?

MEMBER HARVEY: Okay. Suppose there is a repository and at that time will the responsibility be transferred to the government, to somebody else or will it remain to the owner of the reactors even if the reactors are no longer in operation?

MS GLENN: Karine Glenn for the record.

Under the *Fuel Waste Act*, Canada operates under the principle that the polluter pays, so the producer pays. So the money that is required to fund the disposal site for the fuel is the responsibility of the utilities

and, as I mentioned, on an ongoing basis, if there is a DGR, we would continue to monitor the financial guarantees for that DGR to ensure the safe decommissioning or the safe operation of that site.

MEMBER HARVEY: Any comment about that, OPG?

MS SWAMI: Laurie Swami for the record.

So from a decommissioning perspective, the fund is fully funded right now, so there would be sufficient funding if there was a change in our plans. For instance, if refurbishment -- there was some dialogue about what the approval process was -- if that was not to proceed, we would operate the units for the extended period of time that was available to us, they would then be shut down, placed into a safe storage state and there would be a delayed dismantlement program. That is fully funded today and so we would continue to maintain those funds so that we could do that in the future.

From a nuclear waste, from the fuel waste or used fuel perspective, we would transfer the material to the nuclear waste management organization when they have their site available to receive the used fuel. That process, as Ms Glenn has mentioned, is in the siting process today and we anticipate that they will proceed with that project over the next number of years. So we fully expect that that will happen.

From a how do we account for the changes, so if we said we are not going to refurbish for instance Pickering, we would change our assumptions on how much funding is required for used fuel so that we would set aside the amount for the used fuel from a plant that is moving into a shutdown state. So that would be the way that it's done.

So when we look at it every five years, we would adjust the assumptions that we use for calculating what the amount is set aside and that's the process that we are into right now as we prepare for the next round of updates on the funds.

THE PRESIDENT: Thank you.

Dr. Barriault.

MEMBER BARRIAULT: Thank you, Mr. Chairman.

One of the statements that was made in terms of a licence for 13 years is the fact that a 13-year licence would give you a safer environment to work in, if I understand correctly. Can you expand on that and explain that? Because next I would like to know why CNSC is against that if it is safer.

MR. JAGER: Glen Jager for the record.

What I was referring to is we are structuring a plan that spans 13 years which includes modifying the units one by one, in some cases in an

overlapping manner. So we will have a number of units in different configurations and we are going to train our operators to operate the plant in that manner.

All the modifications are not done until we complete that very last outage which follows the final re-tube of the last unit. If we shorten the -- well, with a 10-year licence we haven't completed that process and if we then revisit the modifications and the design basis and the work that we're doing and change that midstream, that will result in a change to plan.

Now, it can be managed but the safest way to execute a plan is what we are doing right now. We spent a lot of time, several years putting together a plan for refurbishment, we brief our staff, we train our staff in the exact way that we are going to do it, including the configuration of the units through that whole timeframe and then we execute that plan exactly as we have laid it out, including the timing of it.

So that really for us is always the safest way to operate. If things change, as Barclay mentioned, we obviously accommodate those changes, but the best way and the safest way to operate is exactly as per the plan that you have laid out.

MEMBER BARRIAULT: With a consistent plan, I guess is what I'm hearing. CNSC, do you care to comment?

Are you against this safety issue? No?

MR. HOWDEN: We are never against going safer for sure, but we are all of the view that it needs to be safe all the time.

MEMBER BARRIAULT: I agree.

MR. HOWDEN: And I did describe -- I understand when you have a big project that uncertainty -- someone executing the project has enough uncertainties and risks that they don't need more uncertainties with regulatory uncertainty. So our view is that from the refurbishment perspective we wouldn't have that uncertainty because we have already committed to the refurbishment through the IIP, from that standpoint. So we are not really seeing an issue there.

We do understand, and we would be looking closely, is the work that they are doing, if they are not complete, they then have to do a relicensing on top of that. So that could be an extra burden on them for sure and we understand that and we wouldn't want -- I don't think that would have a negative impact on safety but it could put strain on their organization. So we would have to be watching that closely but that's something we have to do every day and I think some of the questions that Dr. McDill started out with the management system and the governance is critical to this whole process regardless of

what the licence period is, because you have refurbishment going on at the same time as operation.

So we are really paying a lot of attention to their management and governance for sure, but at this point we have our rationale for the 10 years, but again, regardless of the time period we are always looking at making sure regulatory oversight is there at all times.

MEMBER BARRIAULT: Just as a quick follow-up. I wasn't certain really if you had the necessary manpower to man such a project and do you think you do?

MR. HOWDEN: Yes, we do. So we have done this a couple of times and we have been able to resource and manage those projects and so we are continuing with the same model with the Regulatory Program Division leading with our specialists. Obviously we are going to have to expand on our specialists and possibly on our onsite presence for sure and so we will be able to do that.

In the big picture, the CNSC has a 10-year strategic plan going out to 2025 that you may be aware of. This includes a resourcing strategy which is people and money but it also includes a workforce of the future strategy which has a 10-year outlook with detailed plans of one, two and three years. This is for us to ensure that not only do we have enough staff but they are trained and qualified to be able to go about doing their work. We are

in the process of augmenting our staff now with about 50 new people coming in in the next I would say quarter or so to start that process of making sure the workforce in 2025 can continue to do its work today.

MEMBER BARRIAULT: So what I'm hearing is that even if this project doesn't go it will not have any impact on your forward planning?

MR. HOWDEN: That is correct.

MEMBER BARRIAULT: Thank you.

MR. HOWDEN: So we're always updating our plan on a -- it's a 10-year plan but it's a rolling one year that we can update on a regular basis. And we are trying to get ahead of the curve because everybody is in the same generational mix where we need to get the next generation in and up to speed.

MEMBER BARRIAULT: Thank you. Thank you.

THE PRESIDENT: Thank you.

Me. Tolgyesi...?

MEMBRE TOLGYESI : Merci, Monsieur le Président.

I am going to go back a little bit to that what you were saying, OPG, that budget and scheduled development were approved to be finalized until December 15, 2015. So does procurement and -- procurement is taking place in execution stage or in development stage when you

are talking about procurement and ordering material?
Because that's something where there is long delays.

MR. DUNCAN: Brian Duncan, for the record.

Again, what I would offer there is that some of the long lead materials, absolutely procurement has started on those. It has to.

A lot of the infrastructure we have done onsite, the investment we are making onsite in the new project offices; the two distribution systems, some of the equipment, some of the materials we've already procured and are testing on the mock-up, all of that -- all of that has to happen well ahead of execution. If we waited right to the execution point we would be too late. You know, we wouldn't be able to meet our schedule. We wouldn't be able to necessarily guarantee we'd have all of the materials, all of the training in place that we needed.

So without a doubt there is a lot of effort beyond planning, a lot of expenditure happening now to position us for success as we go into this project. And as Dietmar said, the final approval to go ahead to the next phase will come from our shareholder this year, but we have to be ready for that approval.

MEMBER TOLGYESI: Because that reminds me a little bit, you know, you have not yet the government approval but you are committed to such expenses or

potential expenses. I don't know if you could cancel them, et cetera.

It reminds me a little bit the story of Gentilly-2 where a lot of material were purchased and finally the government didn't give a green light to the project. So how you will manage that one?

MR. REINER: Dietmar Reinar, for the record.

We do keep our shareholder updated on a very regular basis on the progress that we're making in the planning phase of refurbishments so they are very aware of our expenditures. They are aware of our status of work.

And I would also add, as we are progressing through the planning phase there is sort of an iterative development of scope and more and more certainty that you get around the cost and schedule. We always, as we do that, look at the overall business case for the project.

So notwithstanding that we have a high level of confidence we can operate the plant safely and reliably for the next 30 years, we always look at the business case based on the more detailed information that we get as we plan the project. And the business case is still sound. We still expect to -- and we make that -- we make that information available publicly through the Ontario Energy Board process, for example.

We still see Darlington as being a very

competitive low-cost energy provider for the province. So that gives us some confidence as we get close to execution that provided we can stay inside the bounding estimates that we have established that our shareholder would align with a recommendation from us to proceed with the project.

Also, if you were to look at the long term energy plan in Ontario there is a commitment to nuclear power. There is a commitment to the refurbishment of the Bruce and Darlington stations. It's not at all costs. It has to be within an established budget and schedule but we maintain that right through the planning process.

THE PRESIDENT: I would like to move on to the second one and do something different.

We have got guests here from Environment Canada, Fisheries and Oceans and the Office of the Fire Marshal and Emergency Management. And we can ask you to come forward and we'll keep DFO online. Maybe we'll deal with some of those issues, because I want to make sure they are going to stick around here for us to ask those questions.

So colleagues, anybody has any particular question for any of those three organizations? Dr. Barriault...?

MEMBER BARRIAULT: My question is to EMO. I understand that -- well, I'll wait till they settle in, if

that's okay.

THE PRESIDENT: Oh, yeah.

MEMBER BARRIALT: No, EMO.

Yeah, my question is that I understood that there is plans to go to a wireless emergency response for alarms, an alarm system. Can I get some more clarification on how this will work either from EMO or from OPG?

THE PRESIDENT: Emergency Office of the Fire Marshal, maybe?

MR. NODWELL: Good afternoon. For the record, my name is Dave Nodwell with the Office of the Fire Marshal and Emergency Management.

So the question relates to the wireless public alert initiative. OFEM is a partner in this project. I believe that OPG would be in a position to speak to the details of that.

But essentially, to put it in a nutshell, it's a system similar to what is in use in the United States where messages would be able to go out to cell phones and this would be a cell phone within a specific geographic area. So if someone is visiting from Manitoba and happens to be in Durham region at the time that there is the need for public alerting, their cell phone would actually be activated and the notification would reach them, so everyone with a cell phone in that particular

geographic area.

This would be considered a substantial enhancement to the public alerting but would complement what already exists in terms of landlines, sirens, social media, media releases and so forth.

THE PRESIDENT: So does that exist? I thought you require CRTC direction?

MR. NODWELL: My under -- Dave Nodwell, for the record -- my understanding is that CRTC is very much involved in that. I would defer to someone else who is more involved in the project to speak to that.

THE PRESIDENT: Anybody who knows?

MS SWAMI: Laurie Swami, for the record.

OPG is working with a number of agencies to ensure that this meets all the requirements. So if there is an approval required that's underway.

This system would not be simply for nuclear events. This would cover a wide range of emergency conditions. So, you know, Public Safety Canada is working with us as well as another -- a lot of other agencies.

We think this is a very good step forward and we are looking forward to the implementation of this. It gives, as Mr. Nodwell mentioned, it gives the opportunity to do it within a geographic area so you don't have to know the cell phones, email addresses, et cetera to

get the notification to people.

It also has a unique signal. So your cellphone, what you're normally used to receiving, whatever ring tone you might use, this would be unique when it is issued so it would be more to alert people and they would pay more attention to the fact that it was coming in to them. So we think that's a real advantage as well.

So we are working very closely with the other agencies to have this testing in Durham region in 2016. So a very good step forward for us.

THE PRESIDENT: Anybody else has a particular -- Monsieur Harvey...?

MEMBER HARVEY: Environmental Assessment. The second paragraph on June 24, 2015 the Minister of Fisheries and Oceans Canada issued a paragraph for the authorization to carry on with the activity that presents a serious harm to fish, et cetera, et cetera.

Does that have something to do with the authorization you received recently or what does it mean for Darlington? On page 9 of the --

THE PRESIDENT: DFO, maybe you can -- while OPG is looking for their reference, can you comment on the recent authorization that you gave OPG with us very recently? Are there any other outstanding issues from DFO's perspective?

DFO, are you still with us online?

MS WRIGHT: Jennifer Wright with Fisheries and Oceans Canada, for the record.

No, DFO has no outstanding issues with Darlington and OPG at this time.

THE PRESIDENT: Okay.

OPG...?

MS SWAMI: Laurie Swami, for the record.

I believe you're referring to the *Fisheries Act* authorization that we received for the Darlington site. So that is -- that is authorization for our continued use of our intake structure. It looks at fish impingement and entrainment and provides some conditions, some of which we have implemented which is looking at mitigation options through habitat restoration through a habitat bank that OPG set up a number of years when we were -- years ago when we were doing the Darlington New Nuclear Project. So we have used some of that bank as part of the mitigation for the existing Darlington site.

And so we feel comfortable that we have the appropriate authorization now.

MEMBER HARVEY: On page 7, two pages before, under program 11, Aquatic Habitat Biota, at the end on the right column "Impingement and Entrainment" two years of monitoring following restart of all reactors. What could

be different from what it is today after the refurbishment? Could there be any conditions that will change the impingement?

MS SWAMI: Laurie Swami, for the record.

This condition is so that we can confirm the conclusions of the Environmental Assessment that was done for the refurbishment and continued operation of the facility. And so, as part of that, we need to confirm that the conditions that we predicted are still the same when we return the units to service.

We would not anticipate a change but what this is, is confirming the predictions of the Environmental Assessment.

MEMBER HARVEY: But those predictions are almost the same that they did, like it is today. I mean this is reflecting the current situation.

MS SWAMI: Laurie Swami, for the record.

That's absolutely correct. However, for the Environmental Assessment it was still one of the conditions that we would do monitoring after all of the work that was done. So we continue to do that.

It could be that there are conditions in the lake that would change over time that we need to be aware of. So there may be changes. We are not anticipating changes, though.

MEMBER HARVEY: Okay, then. Thank you.

THE PRESIDENT: Any other questions to these agencies?

Well, while we got Environment Canada what about -- is that your thermal effects? And some of the -- I thought there was an incident recently in OPG in Darlington about fish or was it in Pickering? Okay.

Pickering. Okay.

So thermal effects in Darlington, is there still further work to be done in this area?

MS ALI: Nardia Ali, Environment Canada, for the record.

Environment Canada has been, I guess, reviewing and providing comments on different elements of the Darlington Refurbishment EA Follow-Up Program. One of this is the -- one of these things is the Thermal Monitoring Program, yes, so we still have Effluent Characterization Program and it's still a more controlled study.

For all of these things we have provided -- we are working with the CNSC and OPG and things are progressing well. So we have no outstanding concerns at this point.

THE PRESIDENT: You don't see any new conditions or improvements as a result of the

refurbishment?

MR. KIM: Duck Kim. Duck Kim, for the record.

There are several studies that are ongoing with NSERC researchers. Several universities are working together as well as the COG has recently released a study on the effects of thermal -- fluctuating temperatures on mortality and hatch of round whitefish and lake whitefish.

We are working with the CNSC and the experts at OPG and Bruce Power looking at these studies very carefully. There may be improvements. At this point we continue to work at it and it's a little bit premature to make final conclusions on how those studies would impact on the predictions of the EA. But we expect to have some definitive -- or improvements. We hope to have some improvements as a result of those studies.

MR. McALLISTER: If I could just complement Mr. Kim's answer? It's Andrew McAllister, Director of the Environmental Risk Assessment Division.

As Mr. Kim mentioned, we are thoroughly looking at these findings and see how we can best integrate them into a risk assessment context. But one of the ones that was mentioned, the CANDU Owners Group study, or COG for short, a lot of its findings were similar to the science that we had based our assessment in the Darlington

Refurbishment Environmental Assessment.

So you may recall that we looked at it in one of the warmest winters on record. So it gave us quite a lot of confidence that we had a very robust assessment. The findings of the COG study are just further validation that that assessment remains robust.

THE PRESIDENT: Thank you.

Anybody else want to comment on this? Any other questions?

Well, I still can't resist since I have the Office of the Fire Marshal, maybe they will give us a quick update as to how we are doing on the KI pill.

MR. NODWELL: So thank you, President Binder. Dave Nodwell, for the record.

We have heard about KI today and we will be hearing a lot more about it, particularly in Durham Region. It's been a very challenging project and both Durham Region, Toronto and OPG, of course, in this particular area have been actively engaged in establishing a program that not only meets the requirements of the REGDOC 2.10.1 but also meets some of the provincial requirements that we have as well.

We first assembled the KI pill Distribution Working Group in June 2013 and have been working since then for the ultimate implementation of course by December of

this year.

The Working Group focused its efforts on the provincial distribution strategy and it recognizes -- so that there would be consistency across the province in this strategy, recognizing that local distribution methods are the responsibility of the local municipalities and subject to local variation to meet those very specific needs.

At this time we have been meeting on a very regular basis but making substantial progress and we are very confident that those timelines established in REGDOC 2.10.1 will be met.

We did provide a written update to yourself, Mr. President, on July 22nd and will be providing additional details on further progress to the Commission. I believe there is a proposed meeting towards the end of September or early October. So we will be looking at doing that and looking forward to providing additional details at that time.

With respect to Durham Region we are utilizing a mass distribution method, i.e. the mail will be utilized.

This will be supported through a very strong public education campaign that precedes the actual distribution of the pills. So it's absolutely critical that people when they receive the pills know what they are,

know why they're getting them, rather than just receiving them in the mail and potentially discarding them or what have you. So that is scheduled to happen during this fall.

With respect to some of the other jurisdictions excellent progress has been made. I just received an update from Bruce Power earlier today as a matter of fact and that area is looking pretty much completed at this stage.

Similarly work is being done on the secondary zones for both the provision of KI pills to those residents who want them, so making it very easy for residents in the secondary zone to be able to obtain it, but also stockpiling KI in the secondary zone for distribution in emergency purposes.

So all of that is well underway and I look forward to the wrapping up of this phase of the program by December of this year.

THE PRESIDENT: On a related subject, I know your office was interested in the SARP study. I think you commented on it and I was wondering was it useful in reassessing your emergency plans for severe accidents?

I don't know if -- the final report will be ready by September. Why is it taking so long?

MR. HOWDEN: So it's Barclay Howden speaking.

My understanding, our target was September for French and English, but my understanding is that the English will be available much sooner, possibly within the next couple of days.

THE PRESIDENT: Thank you.

MR. NODWELL: Thank you, Mr. President. I think you were referring to the SARP and, yes.

Both the SARP and the health consequences study have been and will be very helpful in terms of assessing the planning basis of the PNERP. They are not, certainly, the only documents that have been utilized but they are being considered in our evaluation of that. So we look forward to the publication of the final version of the health consequences study and we'll be going through that in detail as soon as we receive it.

THE PRESIDENT: Thank you.

I'm back to the normal round here. Dr. McDill...?

MEMBER MCDILL: Thank you.

On page 61 of OPG's document there is a reference -- I think this is more a matter of tenses than anything else but I would like it to be clear. You state "a full parallel radiation protection department that mirrors the station structure". This is under future plans. You say "is in place and being expanded".

So can you explain what you mean by "mirrors the station structure"? Is this a developing new radiation protection department that parallels something or is it just makes it -- I won't say just but an explanation of an existing one?

MR. DUNCAN: Brian Duncan, for the record.

You know in a nutshell, the existing -- by that I mean the organization I have that supports me with the online work programs and the outage work programs, I have a core group that is there all the time. That number increases as I go into outage execution and then drops back off for the regular operational periods.

With a project the size of the refurb, we are clearly -- and it's not just with RP, of course, we are clearly going to have to expand some of these service organizations if you will to support that really what is a very, very big outage over a longer period of time.

So there will be and there is a core group developing. There has been to help in the planning phase and as we move from planning into execution we'll see actually more boots in the ground, if you will. But those organizations will have all the same standards. They have all the same accountabilities. They will have all the same processes and procedures.

So it's not -- it's not like two entities

that are separated and not working together. In fact, they will be moving people back and forth as demands in the refurb changes or all have outages during refurb on the other units. They will have to move people back and forth as well.

So I think it's -- I think it's fair to say that you will see us, as we progress into the execution phase and as we progress into this project, you will see different segments of the existing organization, existing structures grow in size to accommodate that. They may be taking their day to day direction from, you know, a refurb project leader but the organization itself will be just an expansion, if you will, of what we have now.

MEMBER MCDILL: Staff, do you have anything to add?

I have a little follow-up but I'll see what staff says.

MR. HOWDEN: Yeah. I am going to ask François Rinfret to provide comment. Again, you are going back to governance each time in terms of how they stick together.

MR. RINFRET: François Rinfret.

I wouldn't have much to add except that this is one company using one management system, one generic training group and much of the same processes that the data

were not given for the refurbishment operating units.

So that's what staff are going to expect to see as they inspect the licensee and as they are already seeing through the review of the various program adaptation documents that are coming through CNSC for review and concurrence.

MEMBER MCDILL: Again, for the intervenors would it be possible to generate -- it won't be an org chart but some kind of indication of how radiation protection will be -- it sounds like you are saying almost like an umbrella over refurb on one side and operation on the other.

MR. DUNCAN: Brian Duncan, for the record.

You know, not only do we have org charts, of course we have what we call transition plans as we move from an operating, fully operating station to a station operating and into refurb. A lot of -- a lot of detail, a lot of -- you know, if someone is loaned to a project how do you roll them back into the operating side? How do you ensure their training is maintained?

But when I think -- I think absolutely we could put some stuff together before Part 2 which would, I think, make that a little clearer just how we see that interaction going on.

MEMBER MCDILL: Thank you. I think that

would be helpful because the slide deck you produced is something the intervenors are going to look at immediately and it's very top-down which is good for a general explanation but some of this other -- some of the concerns that have been generated previously are not addressed that have come out of previous refurbishments. So I think it would be helpful.

MR. DUNCAN: Brian Duncan, for the record.

We understand. Thanks.

THE PRESIDENT: Thank you.

Ms Velshi...?

MEMBER VELSHI: A question for staff.

You took a couple of years to review the ISR submission from OPG. My question was how much back and forth happened between the gaps that were identified, the plans for closing those gaps, because when you have got something, a term like "extent practicable" there is a lot of subjectivity there.

How much negotiation was there and were there some areas of contention where the staff felt you need to do something about this and OPG was reluctant? I mean it was -- I would like to get a sense of how much dialogue and negotiations happened in that whole process.

MR. HOWDEN: Barclay Howden.

I am going to ask Dan Desjardins who was

intimately involved in this to provide some of the details.

I think there is two things. There was the two versions of the IIP, so of course there was back and forth.

The second thing was from our perspective we don't negotiate. We ask questions to discuss in terms of why they were making certain decisions and other decisions because we would look at the gap analysis to ensure that it's done properly. Then it comes down to what are you going to do and what aren't you going to do?

So I am going to ask Dan Desjardins to describe sort of the back and forth.

MR. DESJARDINS: Daniel Desjardins, Senior Regulatory Program Officer, for the record.

On certain aspects there was considerable back and forth. It was all documented in what we called the "comment disposition forms" and there was a letter sent out. I am trying to remember. It was around June 2013 which was publicly available that showed some of that back and forth.

And in certain aspects there may have been four or five rounds of discussions where we made the comment and OPG came back with a response. We didn't like it; we asked for further clarification. And in some cases it did go on for a considerable period of time. Other

issues were fairly straightforward and got results in the first round of comments.

MEMBER VELSHI: Thank you.

And again just to confirm the Integrated Safety Review, the full report, not just the summary, the Global Assessment Report and the IAP are all available on OPG's website?

MR. DUNCAN: Brian Duncan, for the record. That's correct.

MEMBER VELSHI: Thank you.

THE PRESIDENT: Monsieur Harvey...?

MEMBRE HARVEY : Merci.

It's about quality assurance. On page 35 of your presentation you mention that you will maintain rigorous oversight of vendor/contractor and impart quality. Contracts are required to have human performance programs equivalent to OPG's and also as where I can find that they will be obliged to have their own fitness for duty programs.

So my question is how are you going to monitor that and how does staff -- will have the information of compliance and non-compliance? I mean, how will that function?

MR. DUNCAN: Brian Duncan, for the record.

I'll let Dietmar fill in some of the details

here.

But, you know, in a nutshell we do that with our contract partners today. Any time we bring augmented or contract staff on a site to help us execute work, we expect them to meet our standards. They are working at a nuclear power plant. The rigour with which they execute the work; the quality, the oversight they provide on our people that doesn't change.

We have in the contracts with these various groups, with these contract partners, we have expectations there for how they will assess their human performance, how they will monitor the quality of their work, how they will oversee their people, how they will ensure their people are fit for duty.

And we monitor that independently to look to see: Are they living up to those expectations? Are they meeting those expectations? Do they have a healthy reporting structure so that minor discrepancies, minor challenges are called out and dealt with properly?

And part of the performance contract we have with them is how well they do in those areas. But I'll let Dietmar add some more.

MR. REINER: Dietmar Reiner, for the record.

Yes, as Brian said, there is a requirement for our contractors to be qualified, to execute their work

under the same standards that we are qualified for. We validate that. We assess it. We do that through a variety of mechanisms. We do that through our supply chain organization, for example, as it relates to procurement.

We expect to see corrective action programs that are similar to ours. When there are issues in -- OPG; part of our role for managing the project, we are overseeing how the contractors do their work. So we are day to day. We will be set up to do that day to day observing in the field and doing the monitoring.

And then when, if there are specific quality-related issues that arise, we expect to see corrective actions and we expect to see those get implemented. We expect also to see plans that ensure that those kinds of things aren't repeated. So that's part of our day to day process.

We also -- in the overall quality plan there are also the back-end checks as systems are returned to service and units are returned to service. It's the testing that gets done and the commissioning that gets done to validate that the work was executed correctly. So the plan encompasses all of those things and that is clearly an area that we will maintain strong oversight on.

MEMBER HARVEY: There is no direct link between the Commission and the contractor. I'm wrong to

say that?

MR. HOWDEN: Barclay Howden speaking.

So in terms of our regulatory oversight, we have done a lot of document reviews in terms of what's on paper. In terms of what's actually happening at the site, we are not going to distinguish between an OPG worker or a contractor. We are going to look at what they are doing. So we do inspections but we also do surveillance which is our onsite inspectors.

So I am going to ask -- I have two onsite inspectors today. I am not sure who is going to answer the question but they are going to give you an overview of the types of things that they look for to make sure that the quality oversight is there by OPG of the contractor workers.

MS PERSUAD: My name is Anupama Persaud, for the record. I am a Site Inspector at the Darlington site.

Regardless of whether a worker on the site belongs to OPG or another company we will expect that they will be conducting work with safe practices. We will be measuring compliance with compliance verification criteria that meets regulatory requirements, the licence and any regulations or the *Nuclear Safety and Control Act* regardless of what company that they work for.

We will expect that if we see an unsafe

practice that we will follow our normal compliance process. We will inform OPG and we will expect OPG to handle that and take corrective actions regardless of whether it was their employee or a contractor.

THE PRESIDENT: I think we're not focussing on the concern here. As you know, internationally we are now starting to get more and more concern with the QA of the supply chain itself. They had some fraudulent activities. I am not suggesting we have them in Canada but we are not immune, particularly for some of the components.

So how do you -- are you going to do audits on some of the suppliers and their supply chain? And is CNSC -- you know, the USNRC does audit of the supply chain. Is staff planning to do any of this stuff? Because that's a vulnerability in refurbishment when you are replacing the components. How do you assure quality?

MR. DUNCAN: Brian Duncan, for the record. I will take the first part.

You know, absolutely because of the amount of material we will be bringing in for refurbishment, clearly that's the time. But we are looking at the quality of all the components I am using today. Whether it is replacement parts, whether it's new devices to replace ones that have gone obsolete we have an extensive quality assurance program. Where a supply chain is intrusive with

the vendors, intrusive with the documentation, our supply chain does inspections at the vendors'. There are times where -- it's not even so much the component, but the quality of the work.

So for example, I'm in the process of purchasing new primary heat transport pump motors, and we fly people regularly to Germany where they're manufactured to watch the manufacturing process, to watch the testing, the factory acceptance testing to make sure that all of the requirements we have in place are actually being met or actually being executed, and so that the documentation is clean, that there's no sort of opportunity for any of the requirements we put in place to be missed.

But it's clearly an area where the industry is watching closely. We expect our vendors to be open and transparent. We audit to see that they are. We have the - - in some cases we'll employ third parties to do some of that auditing for us. We also have our own internal auditing agencies that do that kind of a look. But it's very important that we maintain that kind of oversight so that the materials we're getting we can have confidence in.

THE PRESIDENT: Do you have access to the U.S. database on this?

MR. DUNCAN: Brian Duncan for the record.

You know, I don't know the answer to that one.

MR. REINER: I believe we do, yes.

MR. DUNCAN: We can check that out. I think -- the answer is I think so, as well; I'm just not a hundred per cent sure.

THE PRESIDENT: Staff, are you concerned with any of this?

MR. HOWDEN: Barclay Howden speaking.

So you switched from performance of work to supply chain. So on the supply chain side, I'm going to ask Mr. Paul Wong to describe what's being done from our regulatory oversight. And also, we're aware that the industry is increasing its robustness of their supply chain processes as a result of some recent events.

MR. WONG: For the record, my name is Paul Wong, acting director of Management System Division.

Yes, staff is very aware of the issues with counterfeit items that is permeating the nuclear industry recently. As far as oversight of the supply chain, we have looked into and assessed OPG's supply chain, control of the suppliers. And the staff's oversight focuses on how OPG -- or any licensees -- ensure that their supply chain integrity is maintained, including the quality of the items

they're purchasing, including the contractors they're hiring.

And we have checked recently in the last -- this year and last year -- both at Darlington and Pickering. The OPG supply chain does verify the intrusion of counterfeit items into their system -- or rather to make sure that it doesn't. And we are satisfied that their program is working adequately.

THE PRESIDENT: Thank you.

Dr. Barriault.

MEMBER BARRIAULT: Thank you Mr. Chairman.

On the issue of conventional health and safety to OPG, I've noticed that you slipped from fully satisfactory to satisfactory. And historically you've had national awards in occupational health and safety. Do you know why you've slipped?

MR. DUNCAN: Brian Duncan for the record.

Yeah, in a nutshell, we had -- staff had indicated and had detected a problem with the way we tag our scaffolds. We use scaffolds across the plant to access equipment for maintenance, for inspection and the like, repairs. And the way we were tagging wasn't consistent. And it wasn't clear to all users that a scaffold was safe to use.

We've taken action as a result of those observations. And in fact we've changed our tagging practices so that the -- you know, the scaffold experts could always read what they had put down and what they were indicating, but it wasn't clear to all other users. And we've made a significant change there -- not just at Darlington, but Pickering as well -- in how we tag those devices so it's clear to anybody whether it's acceptable to be used within the inspection period or not.

MEMBER BARRIAULT: CNSC, was that just the only issue that dropped them down one notch? Or was there something else going on?

MR. RINFRET: François Rinfret.

It was the most important issue and the only issue for -- covering the year that we just ended. We have our site inspector here that could provide some details of what actually happened and why we made it a big deal.

MEMBER BARRIAULT: Go ahead.

MS PERSUAD: Anupama Persaud for the record.

CNSC inspectors conduct routine inspections as part of our daily job. As part of that inspection, CNSC staff observed that OPG had a sustained failure to comply with their own procedures for the scaffolding program. CNSC observed scaffolding tags that were not updated, which

implied that the actual inspection was not conducted as per the required frequency in OPG's procedures.

Although OPG's procedural requirements are above and beyond industry standard for scaffolding inspections, CNSC staff directed OPG to complete inspections of all scaffold structures in the station to confirm that there was no immediate danger to workers.

OPG completed inspections of all scaffolding in the station and confirmed that all structures were robust and safe for use. OPG has also revamped their scaffolding program to reinforce scaffolding inspection requirements. CNSC staff has reviewed all corrective actions taken to address the identified issue and are satisfied with OPG's response. The action item is now closed.

MEMBER BARRIAULT: Thank you. Thank you, Mr. Chairman.

THE PRESIDENT: Thank you.

M. Tolgyesi.

MEMBER TOLGYESI: Merci, M. le Président.

On page 108 of Darlington, you are talking about Darlington waste management facility expansion. And you are saying that this Darlington waste management facility is covered under a separate operating licence. Now you will have to expand your storage. Is this

expansion requiring a modification to its operating licence, or it's covered?

MS SWAMI: Laurie Swami for the record.

The expansion that's referred to in the CMD is covered by the operating licence. That process we have completed already and are underway on the work to support this. So for this page 108 where it talks about the Darlington waste management facility expansion, it is part of the licence basis.

MEMBER TOLGYESI: And my second question is on page 110. You are talking about tritium removal facility which is unique to Darlington. And the last two paragraphs, what you are saying, that -- before last paragraph, before last line, "During the next 10 years, OPG will make major investment into the plant as part of life cycle." And the following paragraph you are saying "A decision to continue with the tritium removal facility life extension is expected by 2017."

I'm a little bit confused, because if it's - - you are committed to a 10-year investment because this is -- if it is unique to you and it's necessary to you, now you are talking about to expand or not. What will happen? What will happen? What processes will replace eventually this, if it's not expanded?

MR. DUNCAN: Brian Duncan for the record.

The TRF -- actually the TRF has gone into a maintenance outage as we speak, and I am putting investment into that plant to make it more reliable.

You know, we look at the life of the existing TRF and the major components, if you will, within that facility. We have a life expectancy out to about 2025, so about the next 10 years. So just to sustain the TRF reliably to that end of 2025, over the next 10 years I'll be, you know, replacing components, doing maintenance and upgrades as necessary.

What we need to land on by 2017 is what do we want to do after 2025. And there's a variety of options. I could go with a larger scale refurbishment of the existing facility. We could look at newer technologies -- there are some out there -- to replace it with a different kind of facility. And depending, you know, if we look across -- the demand across Ontario -- because this TRF service is not only Darlington and Pickering, but we work with our partners to the north at Bruce Power. We could look and say, Well, is there a need for continued detritiating services of substantial quantity past 2025, or would that be something that we could use a different approach.

So fundamentally, I've got to keep the place working and working well for at least, you know, to the end

of life, roughly 2025. But within the next couple of years I've got to make a decision on where do I want to go after that.

THE PRESIDENT: Thank you.

Dr. McDill.

MEMBER MCDILL: I think it's page 101. No, it's not. No, I've got a -- oh, I'll just ask the question.

Under the Fukushima action items, there was reference to the installation of the passive autocatalytic recombiners, the PARs. I wanted to ask staff if there was any update on -- new research on the use of PARs.

MR. HOWDEN: Barclay Howden speaking.

I'm going to ask Gerry Frappier to comment, yes, because this was discussed at the Darlington -- or the Bruce hearing in terms of PARs and potential issues with hydrogen versus deuterium gas. So I'm going to ask Mr. Frappier to give you an update since the last time we spoke.

MR. FRAPPIER: Thank you very much. Gerry Frappier for the record.

So with respect to PARs, I believe the question you have is not so much whether they're installed, because I think we've gone through that, but some of the questions that have arisen with respect to deuterium in

PARs and that -- that's what I thought. So with that, I'll ask Alex Viktorov, who's been working with AECL out at Chalk River to do some research on this.

MR. VIKTOROV: Alex Viktorov for the record.

Indeed we have been following on the question from Commission as well as intervenors. Last year we have conducted a small-scale program with Chalk River labs to confirm PARs performance with heavy hydrogen gas. As expected, results came with indicating slight differences in behaviour, approximately within the uncertainty of experimental measurement techniques. However, it was sufficient for us to indicate there is a need for more significant large-scale tests, and the industry is following on this. Large-scale tests have been put in plan by the COG to explore PAR effectiveness in the mixture of light and heavy hydrogen gases.

I don't know if OPG would like to add detail to this.

MR. WOODS: For the record, Steve Woods.

I understand that the issue was originally raised during the Bruce hearings at some point, and possibly prompted by the Commission. We have engaged with one of the intervenors using a joint project through CANDU Owners Group examining the intervenor's concerns in detail. One of the specific issues for the first phase of that

discussion regards passive autocatalytic recombiners. And we are working to answer the intervenor's questions and expect to have a written report completed by the end of this month in terms of our initial response, which we will then be reviewing with the gentleman in question. But that's where we're at right now.

MR. HOWDEN: Dr. McDill, can I --

So in terms of the big picture in terms of is safety in place, in our opinion it is. Because there's PARs as well as the hydrogen igniters.

Nonetheless, because we want to have a more fulsome understanding of deuterium -- or I think Alex Viktorov said heavy hydrogen gas behaviour in containment and with the PARs doing their job, we're following up on this at this point in time. It was raised by an intervenor. If there's a change in terms of learning, of understanding, we will make sure that there will be an implementation by the industry.

MEMBER McDILL: So can it be said that there's closure on that item as is stated on page 111.

MR. FRAPPIER: So Gerry Frappier for the record.

So I think it depends what the question is, exactly. So what we're doing, as Dr. Viktorov mentioned, is we're looking at the details of heavy hydrogen going

through a particular PARs and how exactly does it perform. And it would seem there is a change in performance, although within the bounds of uncertainty, anyways.

If the question is more how is the reactor going to behave if hydrogen is put into it, then there's a whole bunch of areas of uncertainty. And because of that, industry, in selecting the number of PARs they're going to be using, have over-selected for the designed-based accidents that we could expect.

And so that from the overall safety of a reactor, at this point in time, we see no difference, no need to make any changes.

MR. VIKTOROV: If I can further elaborate on this. Hydrogen risk is taken very seriously by most regulators and utilities. There are multiple design and operational provisions to handle this risk. PARs is one of them, and all utilities or stations have them installed. Multi-unit stations all have igniters and have had those since the beginning of operation.

In addition to that, there are other options to address these risks through, for example, venting. By venting a reactor building atmosphere, composition can be controlled as well as priority actions to restore coolant to the containment atmosphere.

So the problem is addressed as a multi-element multi-composite issue, and we do believe that Canadian plants are safe in this respect.

MR. HOWDEN: Barclay Howden speaking.

And in terms of the Fukushima action items, for this particular one, yes, we're considering it closed. But as Dr. Viktorov said, there was a lot of other things done with Fukushima. There was the emergency mitigating equipment, emergency preparedness improvement, mutual agreements for aid and emergency preparedness.

As well, OPG is putting in their safety improvement opportunities. Two significant ones are the containment filtered venting system that was just mentioned, as well as the shield tank overpressure protection. These are very important to strengthen the defence and depth barriers in terms of for prevention and then mitigation of the events. As well, OPG is putting in a third emergency power generator. They're doing the powerhouse steam venting system, and they're introducing an independent source of emergency water supply.

So to a certain extent, you can look at the PARs individually, but recognize it's part of a bigger package from the Fukushima action plan. Nonetheless, if there's any understanding that we don't have, we're getting research programs to look at those.

MEMBER MCDILL: Thank you.

THE PRESIDENT: Thank you.

Ms Velshi.

MEMBER VELSHI: Thank you.

I'll start off with OPG and then maybe staff can comment on it.

So in your refurbishment scope, removal of steam generators is not part of it. And from the CMDs, I understand it's because it's made of different material and different operating practices. So not replace now, not over the next 30 years, after refurbishment.

Can you share with us a bit more on your confidence in how well these steam generators will perform both from an efficient perspective, as well, more importantly, from a safety perspective and greater incidence of leaks. And then maybe staff can comment after.

Thank you.

MR. DUNCAN: Brian Duncan for the record.

You know, fundamentally Darlington's benefitted from the operating experience from the industry, and how we manage and how we maintain our chemical control of our feedwater systems, how we maintain the boilers, the kind of cleaning we do in them in outages, the inspection

programs we do, and as well the material that was chosen for the steam generator tubes as well.

So we know. We've done -- you know, we've done a very hard look at this. We know that the material is an outstanding material for longevity. We know the conditions of the boilers themselves is very good. We know that because we've looked. We inspect routinely. We take tubes out from time to time periodically to look at them, assess. We do NDE type -- sorry, non-destructive examination type look at the tubes in the boilers each and every outage.

What we will do -- there are a couple things we've learned. We're going to add a couple more inspection ports in refurbishment and give us better access for secondary side high-pressure cleaning of the boilers to make sure that we don't get any sediment layers building up or in the nooks and crannies, if you will, in the tube sheet on the secondary side.

But we're very confident that the material condition of those boilers is very good. We're confident going forward that we will maintain our chemical control to a very, very high standard -- much higher than where the industry began decades ago -- that we can sustain that confidence in those boilers and sustain the capability to not only, you know, be efficient but remain safe. Because

at the end of the day, there is no advantage to me to run a component so important to my -- to the central part of my operation if I don't have very high confidence and if it's not going to be reliable.

THE PRESIDENT: Is there design life for this -- when you bought the thing, what was the manufacturer's promised design life for this -- and we all know what that means, but I still want to know what the number is.

MR. DUNCAN: So Brian Duncan for the record. Yeah, manufacturers. Well, in this case, the design life was roughly 60 years. The expectation was that if we -- in fact, the reason I smile is that the boiler manufacturer would tell us that it would last indefinitely. They don't believe that if it -- they believe that if it's operated properly, if we maintain the chemistry, if we take care of their product, there is no reason for it to ever fail. I think 60 years is a reasonable number.

THE PRESIDENT: So you will approach this 60 years if you don't replace them; right?

MR. DUNCAN: In fact, yeah, that's correct. You know, if we look out to operation to 2055, that'll roughly be, you know, from 1990 that'll roughly be that time frame.

And you know, for us, though, every outage we go in as part of our fitness for duty and we assess the condition of all the major components, and the boilers among them, to make sure that there's no surprises, to make sure things are aging the way that we expect them to age. And we'll continue to reassess that.

THE PRESIDENT: So to staff, if I may, so how catastrophic would it be if there was a -- kind of one of those leaks in the steam generators that went undetected for a while? Is that a serious accident?

MR. HOWDEN: I'm going to ask François Rinfret to respond to that.

But I just want to reiterate on those steam generators -- they are under a life cycle management plan with OPG. And because of the materials and good chemistry control, they've had good performance. Part of the life cycle is a periodic inspection plan. And they actually have very little tube plugging in their life, which is an indicator that they have done quite well.

In terms of detection of a leak and the potential consequences from it, I'm going to ask M. François Rinfret to reply.

MR. RINFRET: François Rinfret.

I have not much to add except to say that sampling can be done on the secondary side -- basically, in

the feedwater cycle -- to determine whether there's some indication of heat transfer migrating inside the secondary system. So -- easily detectable.

THE PRESIDENT: So you'll be "detect before break" kind of a notion? OPG?

MR. DUNCAN: Yeah, the nature of these tubes would be that you would -- if you were to have a threat, say, or an imperfection from some kind of contamination, you would see a leak over time. You would detect that before they would fail.

THE PRESIDENT: I see some CNSC staff came forward.

MR. HOWDEN: Well, I think -- I'll just set it up. I think you're concerned there could be a small break LOCA is what your concern is. And it would be very small for the tube. And they've already got mitigation systems in place. However, Dr. Harwood may have more to add to that.

DR. HARWOOD: For the record, Chris Harwood from Reactor Behaviour Division.

Yeah, the only point I was going to make is effectively what Barclay said. This is already covered by the safety case, complete rupture of a boiler tube. We accept that it's much more likely that it will leak and be plugged before it becomes a large -- a full tube rupture,

but nevertheless, the safety case does look at a full tube rupture and I think it's covered.

THE PRESIDENT: I can't just say it's my last question on this one. So what's the -- how are you going to decommission all those steam generators, where are you going to put them at the end?

MR. DUNCAN: Brian Duncan for the record.

THE PRESIDENT: Are you going to recycle them, bury them...?

MR. DUNCAN: Gosh, it's difficult, a crystal ball what I'll be allowed to --

THE PRESIDENT: It's only 30 years from now.

MR. DUNCAN: -- what I'll be allowed to do. Certainly our preference, the shell side components would be prime for recycling. If necessary, though, we would make room at the western waste management facility to store them.

THE PRESIDENT: Thank you. Ms Velshi...?

MEMBER VELSHI: So my next question was on the site improvements and the additional infrastructure that you're putting in place for refurbishment.

So would most of these buildings then get dismantled after refurbishment, or do you see continued use for them, you know, whether it's your re-tube waste storage building or whether it's the mock-up building or the heavy

water storage tanks or whatever else?

MR. DUNCAN: Brian Duncan for the record.

The majority of the structures will continue to be used, so probably be re-purposed, you know.

Certainly some of the project offices, for example, will.

And, you know, part of the reason for that was to build something that was robust, robust enough to meet our needs, but only had a limited life span. Actually it makes more sense to build it to last.

And certainly I have some of my facilities, some of my maintenance facilities, some of my office facilities on site are already getting older, so we look forward to when Dietmar finished with them to being able to take those buildings over.

MEMBER VELSHI: And what's your track record been as far as schedule is concerned and getting those in place?

MR. DUNCAN: Brian Duncan for the record.

I guess I'd offer, there's been mixed results there. Certainly some of the structures, the operation support building, that's a complete refurbishment, a complete overhaul of that building has gone very close to schedule and, in fact, it will be ready just about the time I'm entering the VBO this fall.

The D₂O storage project, though, we've had

some significant challenges and a lot of learning there. Groundwater intrusion was much more significant than we expected and, frankly, any time -- we've learned any time we're doing excavation within the protected area, what we find are buried services aren't always where we believed they would be. So when you encounter something you have to adjust and, in some cases, from the very early days of the -- you know, from the 1980s, the construction at Darlington, there would be some of those services that were for construction building, construction facilities were just left, if you will, in ground, left obsolete in place, but as we excavate we find something, we have to rule out what it could or could not be and then proceed. So that's been a challenge for us.

So a lot of learning coming from the civil works, if you will, for the project so far and we're applying that learning as we move closer and closer to the execution of some of the later projects.

So D₂O storage, quite challenge there, but then if I look at the re-tube feeder replacement island support annex, right on the money, right on schedule, right on budget. So we've -- and that's a newer one, newer project, so we're absolutely learning as we go and we've had our challenges.

THE PRESIDENT: Thank you. M. Harvey...?

MEMBER HARVEY: Merci. On page 30, at the bottom of the page under Work Organization of the staff CMD:

"During our refurbishment activities, the minimum shift complement requirements will continue to be in place, monitored and enforced. There are no changes expected to minimum shift complement due to the refurbishment project." (As read)

I'm surprised to see that there. My comprehension was that the shift complement was linked to a certain degree to the operation of the units. So as there will during a long period, maybe many years, only three units in operation, why should the minimum shift complement be the same?

MR. RINFRET: Francois Rinfret.

Before I turn it over to our Human and Operational -- Organizational Performance Division, HOPD, I simply add that in the case of a minimum shift complement that's associated with a four-unit running plant, the effect that during a certain period of time there would only be three or perhaps even two units operating is an indication of lower kind of risk at the plant, therefore, lower probability and lower quantity of risk and potential

consequences.

So from the conservative point of view, I think maintaining the minimum shift is a positive thing.

But I'm not sure if I'm answering your question.

MEMBER HARVEY: But is it too much? I mean, if the minimum shift complement was correct and secure for four units when you've got only three units and two units in operation, I mean, the requirement is a little bit over the necessity.

MR. BOUCHARD: I will take that first --

MEMBER HARVEY: I don't know; I'm not a specialist. I'm just waiting for the answer.

MR. BOUCHARD: Andre Bouchard, Director, Human and Organizational Performance Division.

The minimum shift complement is based on a pretty stringent analysis. That analysis, and you're right, builds on normal operation circumstances, but it also builds on event response and emergency response. Those scenarios include single-unit events and also multi-unit events.

During the refurbishment the station will have some operating units, some units into shutdowns and refurbishes as well. From a basis standpoint, the safety analysis, so the accident scenario remains the same,

therefore, the minimum shift complement to respond to these scenarios remains the same.

MEMBER HARVEY: I mean, if it's secure with four units and it's the same for two units, difficult to catch it like this in a way.

But, okay.

THE PRESIDENT: Next? Dr. Barriault...?

MEMBER BARRIAULT: Merci M. President.

Thank you.

OPG, in your written presentation, page 13, you've got a table, Table 1-2, and it compares I guess the different life operating licences internationally and also periodic safety reviews, but of what significance is this to the application for a 13-year licence?

I'm not clear what was meant by this table, other than what other countries are doing and we don't have all the parameters that were involved in what they were doing. Are they monitoring on a daily basis, on a monthly, on a yearly, every 10 years, every 20 years, whatever? I'm not clear what those meant.

So maybe you could explain that to me.

MR. DUNCAN: Well, it's not meant to be comprehensive, that table, it's just a simple statement of fact, if you will, that asking for a 13-year licence, where in the past we've had five-year periods, is not -- if we

look across the industry, across the world, it's not really an exception to the norm, if you will.

A lot of the jurisdictions, most closely of course south of the border into the U.S., a licence for the period of life of the reactor, but they have as an intrusive a regulator, that regulator's there every day just, you know, with on-site inspections, they have annual updates, they have the same sort of reporting requirements.

For us, it was just to illustrate the simple fact that 13 years wasn't going to be anything extraordinary, if you will, compared to the rest.

MEMBER BARRIAULT: Thanks for clarifying that. Merci M. President.

THE PRESIDENT: Thank you. M. Tolgyesi...?

MEMBER TOLGYESI: Merci M. President.

Is OPG -- on your slide 36, you don't go there because it's not necessary. What you were saying, you were mentioning there's a picture about overpass on 401 and what you were saying that there will be modifications to 401 intersection to facilitate access, et cetera.

When you're talking about transport and highway modification, usually there is quite a long delay because there's environmental assessment, consultation, et cetera, et cetera. So did they start to work on that, or what are the delays and would it be ready for your

refurbishment?

MR. DUNCAN: Okay. Brian Duncan for the record.

If you think of the Darlington site, there's sort of two -- we're south of the highway 401, but there's sort of two major ways to get in or out of the site, an east and a west access.

And the east access, Holt Road, from the west end is Courtice Road and there was two things that have been under consideration, one by the Ministry of Transportation of Ontario and the other by the 407 Consortium.

And both of those projects were looking at Holt Road. The Ministry was looking at upgrading Holt Road from an existing -- it's not a full interchange with the highway, it's a half interchange, if you will, and it's only a two-lane road, they were looking at upgrading that to four; and at the other end, on the west end at Courtice Road, the 407 Consortium is building a link across the north end of Durham and they wanted a north/south link that was going to connect from roughly that location to the new 407 extension.

So we had two major infrastructure projects that were well on the books, well being planned, but planned with agencies outside of OPG. And when we started

to talk with these agencies, some of those plans were going to happen right in the middle of our refurbishment which would make it very difficult for us to get the additional staff in and out of site effectively.

So we've worked with them to bring ahead these projects, in particular the Holt Road interchange, that work is a heck of a mess today, but it is well underway. We fully expect that to be done -- the early parts will be done, the bridge for example, will be finished this fall. I expect the rest of that interchange to be completed by -- and the new service road to be completed by spring of next year.

So by working with them, you know, we asked them to bring their project ahead, and they have done that for us. And that way, we will be done. We will have a very clean entrance in and out, certainly on the east side. The west side's coming along. But well before we get into the refurbishment where we are going to see the big numbers we need for execution.

MEMBER TOLGYESI: And I have a question on the concrete integrity. You were talking about this alkali-silica gel is expansive. Has the thickness of the concrete impacted on the visible signs? You were saying that there is a map cracking and a dark discolouration on the surface. Is this reaction a function of the thickness

of the concrete?

MR. DUNCAN: Brian Duncan, for the record.

The alkali-silica reaction, ASR, that some concrete projects were plagued with, that was an issue that we well understood before the construction of Darlington. And we have seen no evidence of any of that kind of behaviour, because the aggregates we chose, the materials we chose for the concrete for our facility ensured that we would have low challenges from those materials.

So what we are observing as we monitor the concrete as we do our pressure tests, like we will in the VBO this fall, is the performance of those structures is very solid, but the concrete is aging as you would expect. So we see some discolouration, we see some surface cracking the way concrete behaves.

But there is nothing there to suggest to us that we have any concerns about how that material is behaving. Again, we don't expect nor are we seeing any signs of ASR-type phenomena. And really, we believe those structures are in very very good shape.

MEMBER TOLGYESI: Did you communicate with, you know, these hydro power dam operators and construction -- there is a huge amount of concrete. Did you have an exchange with them that not to worry because it is safe,

because they do something. These constructions are even older than the nuclear power stations.

MR. DUNCAN: Brian Duncan, for the record.

Absolutely. I mean, we have the inside edge because of course our predecessor company, Ontario Hydro, built a lot of those dams and we have a lot of expertise within the company on concrete, concrete behaviour, and concrete structures.

So, you know, we have some facilities across the province that are more than 100 years old and are still performing very well. And we are building new facilities in the northern end of the province.

And so all of the knowledge we have, the operating experience we have built up over the years with concrete, all of that went into the construction of our facilities in the early days. And as we learn more, as concrete ages, we stay very tight with our Hydro Thermal organization on what they are seeing, what we are seeing, and compare notes if you will.

THE PRESIDENT: But, you know, I always thought concrete was the least of your problems. Yet, in practically every new construction we hear about, both in the States, in France, they now have huge problems with their concrete. And in Finland it was always some unexpected flaws in the pouring of the concrete, et cetera.

And even in Gentilly-2, you know, it was the surface, don't know how deep it went in, but there were cracks.

So did you consider just increasing the frequency of the review? I think you are doing it every eight years, if memory serves right.

MR. DUNCAN: Brian Duncan, for the record.

I might have to bounce some of the technical details over to Mr. Woods. But, you know, I can tell you that, again, the way we monitor, the way we test our structures is showing very good results.

There are challenges, as we get into new builds. So, for example, as we construct the new emergency power generator number 3, we are doing the civil work for that, the concrete pour work for that.

Over time, you know, to meet new seismic requirements, some of the way we construct those buildings has changed, there is more rebar in the foundation of that building than I have seen in the past.

And so things like how you flow concrete, the size of the aggregate, the spacing of the rebar becomes more and more critical. And I think some of those new projects are finding those challenges as well to meet evolving requirements. They need to be more precise, if you will, or more -- certainly more thoughtful about how

they make sure that the concrete is structurally setting up the way it should and it is getting to all the places it should.

But I will let Steve fill in any other...

MR. WOODS: For the record, Steve Woods.

Further to Mr. Duncan's comments, our concrete structures are periodically inspected in accordance with CSA Standards, part of our licence.

To date, there is no evidence of an alkali-aggregate reaction in any of our concrete structures. In addition to the inspection program, we do periodically test the containment integrity, including a test in the upcoming Vacuum Building Outage, which is to prove the integrity of that structure as well.

And from all of that we can conclude that concrete structures at Darlington are in excellent condition and will continue to perform their designed function during normal and off-normal plant operation.

THE PRESIDENT: Thank you.

Dr. McDill, back to you.

MEMBER MCDILL: One last question, and it goes back to where I started at the beginning today.

What percentage of our inspectors have refurbishment experience now? And is it something that we should consider going forward with this refurbishment

activity?

MR. HOWDEN: So in terms of global --

MEMBER MCDILL: I think we can keep it to the power reactors probably.

MR. HOWDEN: Yes. So based on this guy's experience, about one-third of our inspectors have experience with refurbish, going through the inspection process with refurbished units.

In terms of going forward, so when we do inspections it is not just our on-site inspectors, but we also draw from our specialists. So perfect example is we were just talking about concrete. We have Mr. James Mok who is a specialist in that area. So if we were involved in inspections of their program, he would be involved along with our site inspector here.

So is the question around the concern about whether they are qualified to deal with that or whether we are passing on the experience from one group to another?

MEMBER MCDILL: I think a little bit is -- you might call it corporate knowledge or CNSC knowledge. This is a long refurbishment project, and some of the inspectors will presumably have career development moves, might not be still at Darlington in 2022 or longer.

So is there sufficient exchange of information so that a new inspector or a newish inspector

would recognize an issue? If they recognize it, there is defence in-depth, if you like, at the Staff level. You can come back to the expertise, but you have to recognize there is an issue.

MR. HOWDEN: Barclay Howden speaking.

So I think this is a challenge regardless of whether we have refurbishment or not. I think though we are kind of tackling it through I would say four ways.

So, one, we have a formal inspector training program. Within that, we have an inspection community. So in terms of the power reactors, the inspectors get together either two or four times a year. All the inspectors for training and sharing of experiences.

The second thing we have is as we go through and do inspections formal processes are followed. But also we have what are called inspection guides. So an inspection guide is something where the licence is issued, the licence conditions handbook contains the compliance verification criteria.

And so when we go to an inspection, we create an inspection guide that basically says, okay, based on this regulatory criteria what is the criteria, what are you actually looking for? Like, what is the output you are looking for or the observation that you are looking for and the criteria so that you can make a judgment?

Because if you don't write that down and you don't spend time with someone sharing information, that can be very difficult.

So the other part is we do pair, to the extent possible, our inspectors as they come in. They have a coach normally and they are paired with a more senior inspector as they go through.

We also rely very heavily on our specialist community to be able to document things so that we can get consistency as we go along. So you need to recognize we have four big stations and one of the things we are trying to promote is consistency across the station.

So this was the reason we introduced the inspection guides. So there is a generic guide prepared by the specialist that applies to all stations. And then if a station has any unique characteristics, they are made station-specific.

I will ask this gentleman, who has been working on the program, to expand.

MR. JAMMAL: Ramzi Jammal, for the record.

We have young inspectors who are going to be around for 2020 and 2025 and beyond. So they will describe to you the lessons learned and the sharing of inspection experience through rotation and gaining experience from refurbishment activity at the other sites.

MS PERSAUD: Anupama Persaud, for the record.

In anticipation of refurbishment inspections, current Darlington inspectors have already participated in refurbishment inspections both at Point Lepreau and Bruce during their refurbishment. There are also lessons learned reports that are being prepared from a compliance perspective from both of those refurbishment projects that are being made available to the Darlington site inspectors.

MR. RINFRET: François Rinfret.

Not much to add, except that we have been fortunate over the last two major refurbishments of nuclear power plants to also share knowledge with the provincial authorities on occupational health and safety. These are basic construction sites governed by construction oversight for occupational health, which are slightly different than what we currently have.

So the provincial authority and CNSC are exchanging and have exchanged data and time and resources to be able to complement each other in the area of being eyes and ears for each other's responsibilities in the field, so that helps.

THE PRESIDENT: And even Staff has been consulting on the Korean refurbishment. It didn't happen

that long ago. So I remember a whole exchange of information between Staff. And some of this Staff are still around, right? Many of them are still around.

MR. HOWDEN: Barclay Howden speaking.

That is correct. We haven't restricted our learning just to the Canadian refurbishment, it has been international. We also have the expectation that our licensees have been doing the same as well, and the Korean ones are a good example.

MR. RINFRET: I would like to end by claiming that this is an evolution from the two other major refurbishments, and we have built a reactor oversight plan, and that actually captures what has been looked at and fill in why.

So that will be a tremendous help in order to guide the next generation of inspectors as they enter the field at Darlington.

THE PRESIDENT: Okay. Ms Velshi?

MEMBER VELSHI: I have some very quick clarification questions.

So OPG written submission, page 94. On replacement of reactor components. First paragraph, it says the waste that is produced will get processed and it says, "It will either be stored at the Darlington Waste Management Facility or transferred to a licensed waste

management facility."

So are these just now going to be stored on site?

MR. RINFRET: Sorry, Madam Velshi, could I ask again what page you are on --

MEMBER VELSHI: Okay, sorry.

MR. RINFRET: -- and which document you are on? I think we missed it on our side here.

MEMBER VELSHI: It is the OPG written submission CMD 15-H8, page 94, on replacement of reactor components, first paragraph where it talks about removal of reactor components and says they, "...will either be stored at the Darlington Waste Management Facility or transferred to a licensed waste management facility."

And I just wondered what the licensed waste management facility is?

MR. DUNCAN: Brian Duncan, for the record. I will let Laurie jump in.

MS SWAMI: Laurie Swami, for the record.

So there is a few items that are referenced here. And if you look at the fuel channel assemblies, that piece will be removed from the reactor, will be processed at site, will be placed into containers, overpacked, and it will be stored at the Darlington site for about 25 years, at which time it will be transferred to the Western Waste

Management Facility.

So I think that may be where the issue is?

MEMBER VELSHI: Yes. I thought it was kind of immediately you were going to ship something off site, and I was wondering.

MS SWAMI: So there is one more piece here though. The feeders that are referenced here, they could be shipped to the Western Waste Management Facility. So that component will not be stored at the Darlington site, but be transferred to our low and intermediate-level waste storage facilities.

MEMBER VELSHI: Thank you.

Then, again, the same CMD, pages 95 and 96 on hold points. So I know there is one hold point requiring CNSC approval and that is at 35 per cent full power.

But on page 95, when I look at the section on return to service of reactors, third paragraph down it says, "greater than 30 per cent." I know 35 is greater than 30, but should that be 35 per cent? One of those RCHPs.

MR. DUNCAN: Excuse us just one moment.

--- Pause

MR. DUNCAN: Brian Duncan, for the record. The CNSC has established four regulatory

hold points, but there is five additional hold points, if you will, that we have within the project. And one of those hold points, 30 per cent full power, is for us. And then the CNSC hold point follows at -- so greater than 30 for us, and then follows at 35.

So they are two distinct pieces.

MEMBER VELSHI: Right. It is just, in yours it has all the other CNSC ones except for the 35 per cent, that is why I wondered why the difference between the 30 and 35.

MR. DUNCAN: Yes, sorry, it is just not as clear as it -- sorry, Brian Duncan, for the record -- it is just not as clear as it could be.

MS VELSHI: And my last one is, and this is now Staff CMD written submission on page 88. We spent a lot of time on refurbishment, but this is just on your regular operations. And this is on safeguards and use of the nuclear materials accountancy reporting, e-Business system, the NMAR.

And there is a last sentence on that page, says, "It is expected that OPG adopts this system for use at Darlington."

So when do you expect to have that system in place?

MS OWEN-WHITRED: For the record, Karen

Owen-Whitred, Director of the International Safeguards Division.

For a specific date as to when Darlington would be adopting our NMAR system, I would actually refer you back to the licensee.

I can say that from Staff's perspective what we are doing is working with all licensees that are affected by this type of reporting in terms of encouraging them and assisting them with adopting the necessary technology in order to be able to use the system as soon as possible.

MEMBER VELSHI: Right. So the question is to OPG. When do you expect to have that system in place?

THE PRESIDENT: Are you telling me now you are still doing it manually?

This is a question that is still embarrassing to all. I think we have been asking this now for a few years. Why are you doing it manually?

MR. DUNCAN: Brian Duncan, for the record.

So nuclear material accounting is largely still a manual process. I am sorry, do not know what date we will be aligning to the new electronic system. We can certainly find that out and get back to you all.

THE PRESIDENT: Mr. Jammal?

MR. JAMMAL: Ramzi Jammal, for the record.

If you, Madam Velshi, look at page 97 of the LCH, and we talk about compliance verification criteria. The CNSC, the document title, and then expectation for them to be in full compliance with it is 2016/01/01.

MEMBER VELSHI: Thank you.

THE PRESIDENT: Monsieur Harvey?

MEMBER HARVEY: Merci. My last question is on page 109 of the Staff CMD. It is about the delegation of authority.

You recommend that, as it has been done for other permit holder licences. I just want to refresh my memory how it works. Is this to say when the delegation is done that any one of the levels can by himself give the authorization or it takes two signatures or how does it work?

MR. HOWDEN: Barclay Howden speaking.

For the restart after a serious process failure, it would be one of those positions that --

MEMBER HARVEY: Any one?

MR. HOWDEN: -- could authorize, any one of them, yes.

In terms of for the hold points, that would be if you choose to delegate strictly to the EVP. But in terms of serious process failure, it could be Mr. Rinfret, myself, or Mr. Jammal.

MEMBER HARVEY: But normally when we use that term in our decisions it is the same thing.

MR. HOWDEN: Yes.

MEMBER HARVEY: I mean, this is for one of those levels?

MR. HOWDEN: Yes. But we have to specify them to make it clear to allow a delegation to occur as opposed to say delegating to CNSC Staff. This at least gives you a measure of assurance and confidence of the level that you are delegating the decision to.

MEMBER HARVEY: Okay, thank you.

THE PRESIDENT: Thank you.

Dr. Barriault?

MEMBER BARRIAULT: Pass.

THE PRESIDENT: Monsieur Tolgyesi?

MEMBER TOLGYESI: You were participating in refurbishment of Point Lepreau, your team.

Is it expected that other nuclear generating station teams will participate or even second the Darlington refurbishment?

MR. DUNCAN: Brian Duncan, for the record.

So looking back, we absolutely were able to work with NB Power at the Point Lepreau facility to help them with their refurbishment. And at the same time for us to have people work in that organization and learn from the

challenges they were facing and what was working for them.

So it really was a two-way street. We were able to provide assistance with some of the expertise we had with some of the staff we had in our organization. And for us, we were able to take advantage of that opportunity and learn from their operating experience, if you will, through that project and what we might consider doing differently or more efficiently through the course of our own refurbishment.

We have already seen interest from other organizations that have come to the mock-up facility to look at our tooling, to look at how we are using the mock-up, how we are training our people, all of the equipment that we are putting in place and the plans we are putting in place.

We have had interest from other organizations, other nuclear organizations, for sure that want to come and want to come and learn from us. And, you know, whether ultimately that will workout to any formal partnerships or whether it will be more of the sharing that our industry does among the partners, time will tell.

MEMBER TOLGYESI: I am sorry, just --

THE PRESIDENT: Go ahead. This is the last round.

MEMBER TOLGYESI: A last comment. In the

last line you were saying that, once in place, this team of OPG managers deliver the balance of the project on time and on budget. Does it mean that you are committed to do that, your refurbishment on time and on budget?

MR. DUNCAN: Well, whether Dietmar or I answer, the simple answer has to be yes. You know, the expectation of our shareholder has been very clear, that this project is expected to be executed overall on budget, it is expected to be executed on time. We stake our reputation on that.

THE PRESIDENT: Okay. Last round.

Ms Velshi?

MEMBER VELSHI: I have a couple of more residual questions.

So in spite of this commitment that you have made to the shareholder -- it is the request to operate the units up to 235,000 equivalent full power hours -- so there are two other licensees where we have approved 248,000 and I wondered if you had looked at that and said, instead of maybe having to come back, why not just go for 248,000 now if you have analysis to demonstrate that they can operate safely until then. So, one, have you done the analysis and, secondly, are you now saying there will never be a likelihood that you will come back and ask for an extension to that?

MR. DUNCAN: Brian Duncan, for the record.

Steve will jump in here if I miss anything, but in a nutshell we have done all of the analysis necessary to give us very, very high confidence in the 235,000 hours. We don't see anything, though, that would limit us going beyond that.

You know, we will likely have to do some additional samples. I have a single fuel channel replacement that I will be doing in Unit 1 in 2017 for example where we will capture some more pressure tube material, we will capture garter springs to do further testing on those.

So we will need some more, you know, physical inspections, if you will, which we are planning to do, to ensure that the models we have in place, that the components themselves continue to follow the predicted curves for life.

So at some point, you know, with no limits - - current limits to go beyond 235,000, we may very well consider going further. We would have to obviously make the case and demonstrate that to staff, but at this point in time we don't need more than that.

You know, at this point in time, 235,000 hours gets me to the place I need to be to execute these refurbishments with margin and the refurbishments, the plan

for the refurbishment really is -- it is striking that sweet spot, if you will, about when do you start and when do you want to finish and how does that fit into the overall generation scheme across our company. So we think we are well positioned to ensure the safety of those components absolutely for now, but we will keep our options open looking forward.

Steve, is or anything I missed it there?

MR. WOODS: Steve Woods for the record.

As Mr. Duncan mentioned, the 235,000 effective full power hours is really built around our business plan for refurbishment. It's not based on what we are doing for Pickering, which is different. We have fuel channel life management plans in place for both facilities to support fitness for service to the plant end of life.

As you heard earlier from the staff, there is no kind of cliff edge effect that takes place at 235,000 hours. We have made decisions on investment in our lifecycle management plans which are sufficient to get us through refurbishment with some margin and we are aligned, I think, with staff on the models that we are using for fracture toughness and leak before break.

And finally, our inspection program during our outages exceeds the requirements of the CSA standard. So we have high confidence that we can continue to

demonstrate fitness for service to the end of life.

MEMBER VELSHI: Okay. Did you want to add to this, because I have a couple?

THE PRESIDENT: Just this one.

So presumably you also have been testing, I think -- I don't remember if it was stated in the public -- some of the experience from Argentina and you will have presumably data from Pickering and maybe even from Bruce to give you some more data, if you like, to your physical proof of life extension.

MR. WOODS: Steve Woods for the record.

We continue to work with all of the industry participants in terms of fuel channel lifecycle management and research and development that we are doing through my CANDU owners group.

THE PRESIDENT: Thank you.

MEMBER VELSHI: Again, to OPG -- and I know Mr. Jammal will tell me I should have read the LCH on this also, but this is on Commission updates after each refurbishment where you have proposed coming in front of the Commission. I don't know if there is a requirement in the LCH that they do that, but what do you see as the scope of these updates and particularly around involvement of the public in that?

MR. REINER: Dietmar Reiner for the record.

What we would do is provide an update to the Commission on how the refurbishment went, if there were any significant issues or concerns that arose, key lessons learned that we are incorporating in the next unit refurbishment. So that would be the nature of the update. We would propose to do it in a public meeting. So it's an opportunity for the public to get a similar update at the same time.

MEMBER VELSHI: Thank you.

As opposed to the public having an opportunity to ask questions or intervene in any ways?

MR. REINER: Yes. We don't necessarily see that as an intervening opportunity necessarily.

MEMBER VELSHI: Okay. Thank you.

And is it in the LCH that they would do that?

MR. JAMMAL: He will answer.

MR. HOWDEN: Barclay Howden speaking.

Mr. Jammal knows the LCH inside and out but in terms of -- and it isn't because we haven't made it as a regulatory requirement. That's what they have offered up.

But we will be updating the Commission on a yearly basis with our NPP regulatory oversight and the Commission has invited interventions, written interventions. So it would be up to the Commission, you

know, how much you would like to do, but there is that yearly opportunity where the public has been able to intervene and they could provide their comments because we are going to definitely have a section on Darlington refurbishment.

MEMBER VELSHI: Thank you.

My last one is just a comment. We haven't spent much time, if any time, today on severe accident and my recollection from the environmental assessment hearings was that it took up a substantial amount of time. So the question was: For Day 2, are you planning on providing in your presentation -- this is to staff -- on the study done by the CNSC around that or is this because we have already had a meeting on it that it's out in the public record and it's done?

MR. JAMMAL: Ramzi Jammal for the record.

Definitely for Part 2 there will be a public intervention with respect to the public intervening of Part 1 and the CMDs that have been put forth. As Mr. Howden mentioned a few minutes or a few hours ago, the study itself will be available post incorporating all of the 500-plus comments we received about the hypothetical study itself. So the study will be available. The CMD is already out for comment and the most likely -- definitely there will be interventions associated with the severe

accident and we will be addressing the issues raised by the intervenors or as the Commission directs us to do so through our presentations. But I probably guarantee the fact that there will be interventions and the issue will be raised accordingly.

MEMBER VELSHI: Thank you.

THE PRESIDENT: Anybody else? Any other -- no?

So I have two quick ones.

I just want the record to make sure that there will be -- in the refurbishment there is no more room for surprises, for unknown alpha, beta, neutron, any other isotope, that you would not surprise us. I just want on the record to know that you are going to have all the sensors that will detect anything possible in terms of contamination.

MR. DUNCAN: Brian Duncan, for the record.

Boy, anything we know about, anything we have heard about or anything that the industry has run into, we will be ready for.

THE PRESIDENT: Well, we learned from Bruce, right --

MR. DUNCAN: That's correct.

THE PRESIDENT: -- that the alpha was a big surprise. I don't like surprises.

MR. DUNCAN: Brian Duncan for the record.

We don't like surprises either and, you know, we will be ready for that.

THE PRESIDENT: So all the sensor stuff, all the possible sensors -- you know, we always talk about alpha, beta, gamma -- there is no other like neutron sensor or anything like that, is there?

MR. HOWDEN: I think we are fully aware of all of the possible forms of radiation and the alpha, we ourselves have had lessons learned from our oversight that we are going to apply to their regulatory programs for sure. Once they get all the fuel out that should get rid of your neutron source, but nonetheless you will still have alpha, beta and gamma to deal with.

THE PRESIDENT: And my last question. Somebody mentioned that you did a survey of the local community and 80 percent of the population sort of supports refurbishment. Is that survey posted? I didn't catch that.

MS SWAMI: Laurie Swami --

MR. DUNCAN: Brian Duncan for the record.

The simple answer, don't know. We can find that out, though.

I do need to correct one thing earlier, though, if I have an opportunity. I don't mean to deflect

from this but earlier I was asked -- and forgive me, I can't remember which Commissioner it was -- if the GAR or the ISR, IIP was posted and the answer was yes, but the ISR, just to be absolutely clear, it's the summary report that's on the Web. The ISR itself -- and forgive me, I stated that wrong, -- the ISR itself is actually too big, it's about 20,000 pages, it's available on request on a CD, but the ISR, the full ISR isn't on the Web.

MS SWAMI: Laurie Swami for the record.

Just if I could clarify. The question you asked was whether this survey was available publicly and it's hard for us because there are over 100 documents that we put out to be available for the public for this hearing. That one is not available. However, we have a lot of other information and certainly we can summarize the results for you, if that's helpful, for the next Part 2.

THE PRESIDENT: Well, for Part 2 it would be interesting to share the information with the local community view about this affair.

Okay. Any final comments from OPG?

MR. DUNCAN: Well, first of all, thank you for the opportunity to present, to walk through our submission. I know we took about an hour of your time, that's a long time to listen to us talk, but I appreciate that.

You know, bottom line, there are a couple of things I think that are really important.

We sent people down to California to watch the manufacture of potassium iodide pills to make sure they were on track. I have a video they sent me on my BlackBerry showing, yes, those pills are coming off the line. We have mockups of what the package is going to look like going out to the community. When we get to Part 2, you know, we will be much further along. We will have some good news when that time comes.

The other thing I would offer is, you know, we are asking for 13 years because we believe that is the way to plan, that is the way to be prepared to put us in the best possible position to get through this refurbishment period. I know there's not perfect alignment between us and staff on that but we sincerely believe that is the right time period for a new licence period for us and we really strongly feel that way and for all the right reasons.

THE PRESIDENT: Thank you.

So this concludes Part 1 and we will see you for Part 2 in your space, if you like, in your community.

Marc, any further comments here?

MR. LEBLANC: Yes.

Exactly as you said, as I mentioned earlier,

the hearing will be continued with Part 2 on November 2nd. We have already planned November 2nd to November 5th at the Hope Fellowship Church on Bloor Street in Courtice.

Interventions by members of the public are due by no later than September 28th.

So we will resume with tomorrow's meeting at 9 o'clock.

Thank you very much. Bonne fin de journée.

--- Whereupon the hearing concluded at 6:14 p.m. /

L'audience s'est terminée à 18 h 14